The Chemical Age

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Competition in a Saturated Market

MOST markets are to-day in a saturated or even super-saturated condition. The manufacturing capacity in most industries is greater than the demand, so that manufacturers find it difficult to sell their products and to keep their works going. To do this when competition is unregulated, a proportion of those engaged in any industry will cut their prices so that profits disappear and even overheads are subtracted from the prices quoted. The elimination of "cut-throat" competition has been one of the principal preoccupations of industrialists during the past few years, and although considerable progress has been made, it cannot be said that this pernicious practice has yet disappeared. One notices it more perhaps in respect of engineering works than of works manufacturing chemicals, probably because the engineering works employ more men per unit of work done.

Some suggestions have recently been put forward by the managing director of a well-known north country firm engaged in the manufacture of plant, that raise the vexed question of costs and estimating. He holds that the formation of price rings has been the chief method by which manufacturers have endeavoured to keep up prices in order to prevent uneconomic competition. It must be clearly understood that where price rings exist they have been forced upon the industry that has adopted them, not in order to gain an advantage over their customers and additional profits for themselves, but solely to prevent the manufacturer who wishes to do an honest piece of work for an honest return from being forced to close his works because he cannot get orders at a price that enables him to avoid making losses. Buyers are always keen to take advantage of low prices, and some buyers are distinctly unscrupulous in the methods they adopt to depress prices. The price ring, as used to-day, is partly an insurance against these practices. It is also designed to protect manufacturers against themselves. It is a truism in the engineering trade, for example, that all pay the same price for steel (whether as sheets, bars, billets or what not), that their equipment is similar, so that labour is similar, and therefore they should have the same costs, and, other things being equal, should quote the same prices. If local rates add too greatly to the overhead costs, that works against the depressed areas, so that price arrangements assist the depressed areas and might be justified on this account.

In some instances it is difficult to operate these rings. Few are completely closed, and from most of them a loophole can be found by the unscrupulous. The author of the plan under discussion admits this, and also admits that competition must not be eliminated. It is, indeed, not in the interests of an industry to eliminate competition; there is nothing that puts a buyer's back up more than to feel that his power of free action has been taken away from him, and that is the way to drive orders abroad. The essential is to maintain competition, but to see that competition is put on a sound basis. There is little or no price competition in brains or (which comes to the same thing) in processes involving patents and skill in designing and planning. There the competition is on technical grounds, and that is the best kind of competition. The great mass of competitive prices, however, are put in in respect of more or less standardised products or plant which can be made equally well by several concerns.

In the experience of the author of the plan, "cut-throat competition" usually arises when the offenders have no proper costing system, so that those who cut prices below cost of production do so because they do not know what their cost really is. It may be that cut prices are only quoted on certain items, or on certain lines; the losses are covered by other items or by some profitable line so that the rest of the works can be run at a loss by allocating too great a proportion of labour or overheads to the profitable lines. The plan is therefore, in brief, that the adoption of sound costing systems should be made compulsory, so that every firm in any one industry knows exactly how it stands at regular short intervals. If by this method firms that were quoting too low prices could be early made aware of their losses, it is felt that uneconomic competition would be avoided. The further suggestion is made that there should be compulsion upon all firms to send in a return periodically to some central body, and in the event of persistent losses investigation should be made and legislative action taken before the bankruptcy court is reached.

In the chemical and chemical plant manufacturing industries there might be some closer control over the finances of businesses. It would be all to the good if some generally accepted system of costing could be adopted for each industry or type of manufacturer so that every concern operated and quoted prices on the same general basis. But it does not seem as if this proposal is adequate to prevent the type of competition which prompts a firm to undercut on certain items to get back labour, materials and part of the overheads, whilst making its profits on the one or two paying items. So long as firms have several different lines of manufacture, it seems difficult to devise anything better than price rings.

Notes and Comments

Imperial Chemical Industries Profits

THE preliminary statement of the results of Imperial Chemical Industries, Ltd., for the year ended December 31, 1935, issued last week-end indicates that there was again an improvement in most if not all of the company's activities during the year. After providing, as before, £1,000,000 for the central obsolescence and depreciation fund there is a net profit (before deducting income-tax) of £7,352,430, against £6,965,038. Again £1,000,000 is placed to general reserve, and the dividend of the ordinary stock, which rightly forms the bulk of the capital, is again 8 per cent. As the final legal decision on the scheme for converting the deferred into ordinary stock was not yet given, the dividend on the £5,434,141 of ordinary stock resulting from the conversion of the deferred shares is to be the same as if the conversion had not taken place —namely, 4 per pent.—which is equal to 2 per cent. on the original amount of the deferred. But if the scheme is confirmed a further dividend will be paid of 4 per cent., making, of course, the same dividend as the other ordinary stockholders receive. The company has an issued capital of £72,000,000 and is directly or indirectly interested in practically every phase of industrial and trading activity.

Food Chemists' Continental Tour

ARRANGEMENTS are being made for a party of British food chemists to pay a visit to Holland next month to see Continental methods of food production. The tour, which is being arranged by the Food Group of the Society of Chemical Industry, follows on the great success of a similar visit paid last year to Paris and Brussels. At a moment when food production and processing in this country is more under discussion than ever before, it is of perhaps more than ordinary interest that some of our most famous food chemists will examine Continental production methods. Amongst the factories which will be visited will be the Vandenbergh margarine factory at Rotterdam, the de Gruyter food products works at s'Hertogenbosch, the South Holland brewery at the Hague, the Organon pharmaceutical factory at Oss, and the Hollandia dairies at Amsterdam. There will be a reception by the Dutch Chemical Society at Amsterdam, sightseeing drives around Scheveningen and the bulb district of Noordwijk, and a visit to the municipal laboratories at Amsterdam.

Low Temperature Science

POPULAR interest in science has never before been at such a high level and the people living in and visiting London are lucky in having free access to such a national institution as the Science Museum at South Kensington where not only can the latest wonders be seen, but there, also, in connection with the Very Low Temperatures Exhibition, they may listen to lectures and witness demonstrations by world-renowned authorities on subjects never before revealed in public. The first lecture of the series was delivered in the lecture theatre of the Museum on Wednesday by Professor M. W. Travers, D.Sc., F.R.S., of Bristol University, on "The Technique of Low Temperature Investigation." The lecturer spoke with the authority of a pioneer, having over thirty years ago been associated with Sir William Ramsay in the discovery of neon and other rare gases in experiments carried out at University College, London. These discoveries were the outcome of investigations at low temperatures and have resulted in the familiar neon signs and other forms of modern illumination. In tracing the work of various investigators from the time of Michael Faraday, Professor Travers explained in a popular way the methods by which very low temperatures are attained, and illustrated his remarks with a number of demonstrations. Some of these demonstrations required the use of liquid hydrogen, first produced in any quantity by Sir James Dewar at the Royal Institution at the end of the last century. This was one of the greatest wonders of the time, and even to-day it can only be produced in one or two specialised laboratories. Special arrangements were made for the liquid to be brought from the Clarendon Laboratory, Oxford. Except for helium, liquid hydrogen is the coldest liquid known, its temperature being approximately – 253° C. Among the experiments which Professor Travers performed was one to show how the rare gases were discovered by the separation at low temperatures of the gases in the atmosphere.

Ravages of the Sea

RESULTS of nineteen years' research on the ravages of sea water on timber, metal and concrete are surveyed in the fifteenth report of the committee of the Institution of Civil Engineers on the deterioration of structures in sea water (H.M. Stationery Office, 12s. 6d.). Hundreds of specimens of various materials have been exposed to the action of sea air and sea water at home, in the tropics, and at ports elsewhere in the Empire. Damage to timber by sea water is mainly caused by ship worms, known to the scientist as *Teredo*. Impregnating the timber with poisons has been found to be the most satisfactory method of dealing with their attack, and the most efficient poison has been found to be chlorodihydro phensarsine, which was used as a poison gas during the war. In tests on the corrosion of iron and steel specimen bars of fourteen different materials were used and considerable variation was found in the extent and nature of the corrosion at the different observing stations. On the whole there was little to choose between wrought iron and mild carbon steels, both being cleaned from scale. Owing to reports of failures in reinforced concrete piles and structures exposed to sea action the committee undertook an investigation to determine the cause of the failures and the steps to be taken to prevent their recurrence. Some 474 reinforced concrete piles made of various concrete mixtures were exposed, some at the Building Research Station at Watford, and some at Sheerness, while some were forwarded to the Gold Coast for exposure under tropical conditions. Results given in the report cover examinations over a period of five years, and experiments are being continued for a further five years, when a supplementary report will be issued.

Sulphuric Acid from Sulphuretted Hydrogen

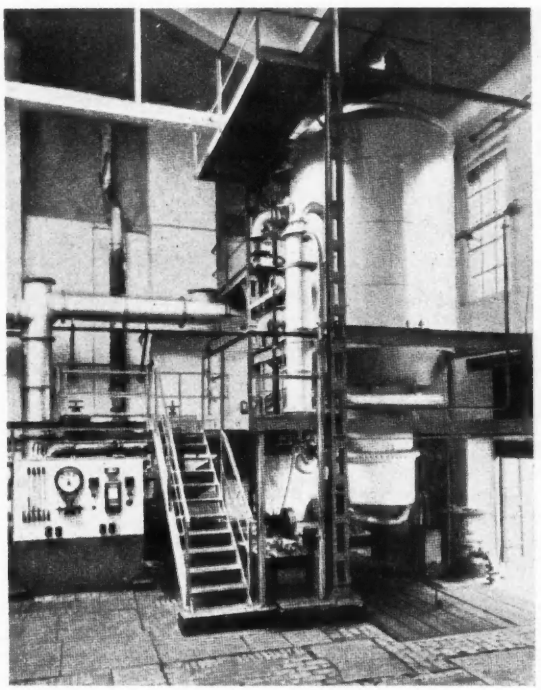
A New Process in Germany

A NEW process which offers the possibility of treating, in a simple manner, sulphuretted hydrogen or sulphur with a view to obtaining sulphuric acid is described by Dr. Wolfhart Siecke, of the chemical laboratory of the Metallgesellschaft A.-G., Frankfort-on-Main, in the Metallgesellschaft "Periodic Review" for February. Apart from special cases in the manufacture of lithopone and permanent white, the new process can successfully be applied in the distillation of pit coal, carbonisation of lignite, hydrogenation of sulphur containing tars and tarry oils and in the industry dealing with natural gases, where hydrogen sulphide is obtained as a by-product.

The new process comprises three stages. The sulphuretted hydrogen is burnt in an excess of air: $H_2S + 3O = SO_2 + H_2O$. The combustion gases, without having undergone any preliminary treatment, are passed over a catalyst, where the SO_2 is oxidised into SO_3 without being affected by the aqueous vapours present: $SO_2 + O + H_2O = SO_3 + H_2O$. The reaction gases enter a condenser, where the gaseous sulphuric acid is submitted to a fractional condensation: $SO_3 + H_2O = H_2SO_4$. Considered as a whole these three stages are expressed by the formula:

$$H_2S + 4O = H_2SO_4.$$

The catalysis as well as the condensation present entirely novel features in their technical operation.



The Converter as employed in the new Sulphuric Acid Process.

Sulphuretted hydrogen can easily be burnt as soon as it is generated alone or together with an inert gas, such as nitrogen or carbonic acid. The amount of oxidation heat of sulphuretted hydrogen is considerable reaching 123.7 cal. per gramme-molecule for the equation: $H_2S + 3O = H_2O + SO_2$. The combustion heat required for oxidising carbon monoxide into carbon dioxide amounts to only half, *i.e.*, 68 cal. per gramme-molecule. In view of the fact that the succeeding contact process calls for gases with a percentage of SO_2 ranging between 4 and 7 vol. per cent. and with an oxygen content of from 5 to 8 per cent. by volume, considerable quantities of excess air are required so as to reduce the temperature of combustion. In practice the temperatures obtaining in the combustion chamber range between 750 and 800° C. If the gases are very poor in hydrogen sulphide, containing *e.g.*, only 10 vol. per cent. H_2S and 90 vol. per cent. CO_2, difficulties will be met with when carrying out the combustion with a free flame, as the ignition of the gas by means of a pointed flame, especially with aqueous vapour present, very often fails. This inconvenience can be overcome by providing the firebrick-lined furnace with a vault or with ribs, or by lining it with a grating of firebricks, at the hot surface of which the sulphuretted hydrogen will readily ignite and burn. If the latter is produced in a mixture with air and oxygen, it is imperative to maintain a certain speed of flow of the combustion gas in the burner so as to prevent the flame from striking back. When sudden stoppages occur, due, for example, to the failure of a blower, there is the likelihood of the speed of flow being much diminished, and hence it is expedient to insert in the hydrogen sulphide current, before the burner a gravel filter, to which the flame may strike back and be extinguished without danger. This arrangement has given results in industrial practice, so that in cases where sulphuretted hydrogen mixed with air is to be treated the combustion can also be effected without difficulty.

The combustion gases enter the contact equipment with about 4 to 7 vol. per cent. of SO_2 and 5 to 8 vol. per cent. of O_2 at a temperature of about 400° C. The converters to be used are equipped either with a tubular system or with a series of grids, in most cases the latter type will be preferred, as it offers a lower resistance to the gas flow. The converter is provided with a jacket which while setting the plant into operation serves as heating jacket and, after the plant has been run in, as cooling jacket. In every sulphuric acid contact plant it is imperative to cool the converter, seeing that the reaction: $SO_2 + O = SO_3$ generates 23 cal. of heat which have to be removed in order to render the process efficient from a quantitative point of view.

What is involved here are the well-known correlations between equilibrium and reaction velocity which call for temperatures between 350 and 450° C. for the catalysis to take place. From the oxidation heat it can be calculated that the oxidation of 1 per cent. SO_2 by vol. raises the temperature of the reaction gas by 30°. Therefore, when the gas enters the converter at a temperature of 400° C. and with 5 vol. per cent. the rise in temperature theoretically obtained with complete conversion is 150°, so that the gases will get heated up to 550° C. But according to the equilibrium a considerable dissociation of the SO_3 into SO_2 and O_2 will result at this temperature, and it is for this reason that the reaction heat must be led away in order to obtain a conversion as complete as possible. In the normal contact process the reaction heat is led away in a heat exchanger by means of cold, fresh gas containing SO_2 which, in turn, gets heated up to reaction temperature.

All modern designs of converters are governed by thermotechnical questions, and special measures and contrivances are necessary in order to ensure a proper cooling at the most suitable point. In the process described in these pages this important matter is much more easily dealt with. The reaction gases are produced in a hot state, and can from the very first be sent into the converter at the optimum temperature. The cooling is effected by means of cooling air which, unlike fresh gas, is available in unlimited quantities and at the desired temperature at the most suitable point. The advantages of this will be easily understood. Moreover, since the gases from the very beginning are fed to the converter at the optimum temperature, any fluctuations in their SO_2 content will not impair the catalysis, even if the SO_2 content falls off to 2 per cent. by vol. All that is required in such cases is to throttle the cooling air feed, or to shut it down

completely, in order to avoid any disturbances. With the normal catalysis it is not possible to work with gases of a concentration of less than 3.5 to 4 vol. per cent., because the oxidation heat will not suffice to bring the gases up to reaction temperature. In this case the catalyst is " run cold."

The water content of the gases does not affect the oxidation when a suitable catalyst is chosen. Platinum catalysts are hardly suitable for this sort of catalysis. Also catalytic masses containing tin dioxide or sesquioxide of chromium, which *per se* would be quite suitable for the SO_2 catalysis, will quickly prove a failure if the gases to be treated contain aqueous vapour. At the temperatures obtaining during the catalysis, *i.e.*, between 350° and 450° C., there does not exist any gaseous sulphuric acid in a strength of 47 per cent. H_2SO_4 by vol., as it is completely dissociated in SO_3 and H_2O vapours. At the beginning of the trials one had presumed to be able to shift the equilibrium $SO_2 + O = SO_3$ to the right by introducing water vapour into the converter, as the SO_3 was supposed to form gaseous sulphuric acid in combination with water, but on account of the dissociation of the sulphuric acid this takes place to a minor extent only. Results obtained in this respect have shown that the shiftings are of such a trifling nature that they may be considered as falling under the admissible tolerances. It must be inferred, therefore, that the conversion of the SO_2 into SO_3 is affected in neither a favourable nor an unfavourable sense when using a vanadium catalyst. The yield of the contact process is very satisfactory. When working on an industrial scale, yields up to 98 per cent. and over were reached in spite of the sulphuretted hydrogen being supplied—as a by-product—in very irregular quantities, fluctuations between 4 and 6 per cent. SO_2 by vol. being quite customary.

Condensing the Dissociated Sulphuric Acid

The contact equipment is directly followed by the apparatus destined for condensing the dissociated sulphuric acid. The gases enter the condenser at about 350° C., and leave it at a temperature ranging between 80 and 100° C. The condenser is of the tubular type where the cooling is effected by means of evaporating water. Oil or cooling water may be used instead of aqueous vapour, but it should be borne in mind that sudden cooling of the gases must be avoided. To this end it is necessary to bring the velocity of the gas flow into line with the cooling velocity. By means of this careful

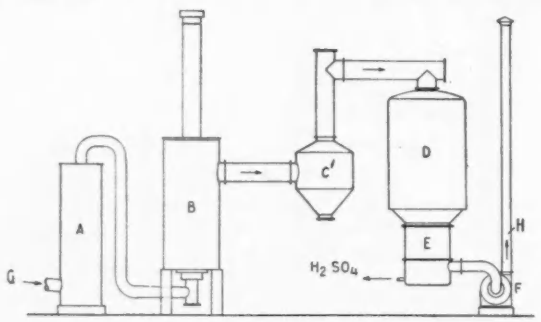
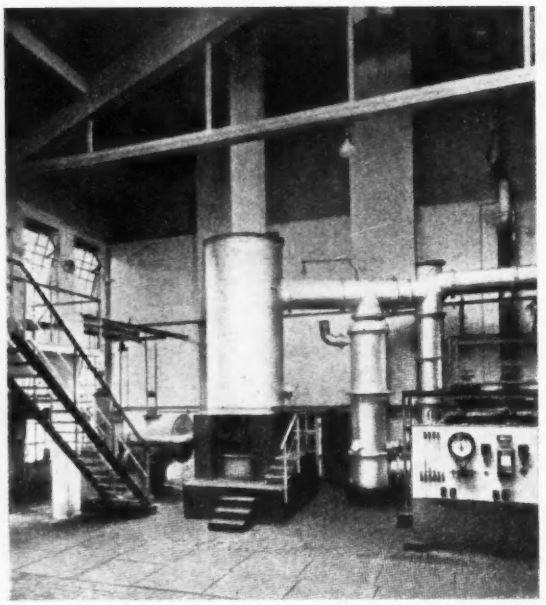


Diagram of a plant for producing sulphuric acid from hydrogen sulphide. A. Scrubber. B. Furnace. C. Ceramic filter where the gases before entering the converter are freed from dust. D. Converter. E. Condenser. F. Fan. G. Waste gases. H. End gases.

cooling only a limited number of condensation cores is obtained which promote further condensation leading to the formation of acid drops without any generation of mist. The condensation into liquid acid drops is so complete that in most cases only a very slight and short trail will issue from the stack. By a suitable regulation of the temperature the condensation can, in certain limits, be effected by fractions, so as to be independent as far as possible of the water content of the SO_2 gases. The combustion of H_2S produces a gas which contains one gramme-molecule of water per gramme-molecule of SO_2 thus having sufficient quantities of water by itself for the formation of acid. Since the sulphuretted hydrogen originates from a washing process it always contains moisture, so that frequently a considerable amount of excess water has to be worked up, which nevertheless will not cause any trouble owing to the fractional condensation. The practical results of the latter are that water-white acid with 86 to 90 per cent. H_2SO_4 is produced of such a quality as to allow its direct use as battery acid after dilution.

Two plants are operating on the system at the present time. The one running since November, 1933, at the gasworks of Frankfort has a daily output of about one ton of



The Hydrogen Sulphide Furnace.

monohydrate. The other, put into operation in June, 1935, at a large coke plant in the Ruhr District, has a daily output of six tons of acid of 60° Bé (in the form of sulphuric acid of 90 per cent.). Both plants successfully work up sulphuretted hydrogen contained in the waste gases issuing from the ammonium saturator.

Gases from Coke Oven Plant

Modern coke plants eliminate the ammonia gases from the coke oven gas by means of the indirect method. In doing so, 30 to 40 per cent. of the sulphur contained in the raw gas pass into the ammonia liquor which consists of ammonium carbonate and ammonium sulphide. The ammonia liquor produced is further worked up to ammonium sulphate. To this end it is passed over stills, where the ammonia salts, *i.e.*, ammonium sulphide and ammonium carbonate, are volatilised. These gases are washed in the saturator with sulphuric acid and the ammonia is fixed and recovered in the form of ammonium sulphate, while carbonic acid and hydrogen sulphide escape as waste gases. These waste gases are a nuisance because of the sulphuretted hydrogen content. In both of the above-mentioned cases the waste gases were either discharged into the open air, or burnt and destroyed. It is here where the new process comes in. The waste gases leaving the saturator at a temperature of 100°, saturated with water, are cooled in a scrubber irrigated with water. The cooling is effected on counter-current principle, the cooling water running off hot and thus not absorbing any sulphuretted hydrogen. The composition of the waste gases may strongly differ at the various works, depending on the composition of the ammonia liquor which in turn is dependent upon the kind of coal submitted to coking and upon the system of

producing ammonia liquor. The waste gases normally contain 20 to 30 per cent. of H_2S by volume and between 70 per cent. and 80 per cent. of CO_2 by volume. In addition, they always contain impurities such as hydrocyanic acid, rhodanic acid, phenols, naphthalene and the like.

Special value has been attached during the past few years to the manufacture of coarsely crystalline ammonium sulphate as being most easily disposed of, and the procedure has been adopted of agitating the saturator content with compressed air with a view to obtaining such coarse crystals. In these instances the waste gases are obtained in a mixture with air. The plant erected in the Ruhr district treats such gases; their composition being, apart from the aforesaid organic impurities, as follows:

16	%	by volume	CO_2
11	%	,, ,,	H_2S
14.6	%	,, ,,	O_2
58.4	%	,, ,,	N_2

The waste gases treated per day come to 9,600 cu. m. with 11 per cent. of H_2S by vol., which corresponds to a production of 1.4 tons of sulphur. After the combustion with excess air 22,000 cu. m. of gas with about 4 to 6 per cent. SO_2 and 10 vol. per cent. O_2 enter the contact apparatus, which produces 5.6 tons of acid of 60° Bé per day. A vanadium containing contact mass of the I. G. Farbenindustrie is used as catalyst. The conversion ranges between 95 and 98 per cent.; and there are no losses due to incomplete condensation. The waste gases escaping into the open air contain about 0.1 per cent. of SO_2 by vol. and are completely clear. The fan works with a suction of 200 to 250 mm. of water column. The power consumption of the whole plant is very low, only 30 kWh being required per ton of acid produced. The consumption of cooling water for the acid condensation amounts to 13 cu. m. per ton of acid of 60° Bé, and the strength of the acid produced is 65° Bé (86 to 90 per cent. H_2SO_4). It is water-white, free from arsenic and nitrose, and can be used after dilution as battery acid.

In both plants the acid is used for making ammonium sulphate for the requirements of the works. Owing to the simplicity of the apparatus and the working method the running of the plants involves only a few manipulations; in both plants no specially trained labour is needed. In the one case, supervision is carried out by the men attending on the saturator, and in the other—in view of local arrangements—by the man in charge of the lime dressing and the phenol plant. Working expenses are consequently very low, amounting for cooling water (13 cu. m.) and power consumption (25 kWh) to RM 1.50 to 2 per ton of acid of 60° Bé only.

The new sulphuric acid process has been developed in the laboratories of Metallgesellschaft A.-G., under the supervision of Professor von Girsewald, by Dr. Siecke, who was substantially assisted by Dr. M. Wohlwill. Both in Germany and abroad the process is covered by patents. Its sale is controlled by the Lurgi Gesellschaft für Chemie und Hüttenwesen m.b.H., Frankford-on-Main.

The Technique of Low Temperature Investigation

Professor M. W. Travers Reviews the Subject Historically

THERE is an analogy between the attempts to attain to very low temperatures, and Polar exploration, or to attempts on very high mountains; the difficulties and dangers can only be partially foreseen and the rewards are not as a rule material. To the general public in approaching low temperature problems, however, there is another difficulty, said Professor M. W. Travers, D.Sc., F.R.S., in a lecture delivered at the Science Museum, London, on Wednesday, April 1, in connection with the Very Low Temperature Exhibition. Our senses will tell us whether any object, or the surrounding air, is a little hotter or colder than our bodies. However, in the case of such substances as solid carbon dioxide, liquid oxygen or liquid hydrogen, contact with the flesh for more than a moment will produce an effect which might be that of extreme heat or extreme cold. One has to get down at once to physical measurement, and the simplest instrument for measuring temperature, over a wide range above and below that of the air, is the gas thermometer.

Physical Meaning of Low Temperatures

The hydrogen and helium thermometer can both be corrected to what is called the ideal gas scale, which is practically the same thing as the absolute scale. By measuring the change of pressure exerted by the gas, when the volume is kept constant, and by giving the pressure, when the bulb is immersed in ice, the value of 273 units, other temperatures would be indicated by:—

Steam	373 units	100° C.
Ice	273 units	0° C.
Solid carbon dioxide	194.5 units	−78.5° C.
Liquid oxygen	90 units	−183° C.
Liquid hydrogen	10.3 units	−252.7° C.
Liquid helium	4 units	−269° C.

The gas thermometer fails at lower temperatures, because the helium forms a liquid with very low vapour pressure.

In lectures to be given later in this series other speakers will explain the physical meaning of very low temperatures. For the moment it should only be pointed out that the pressure of the gas in the thermometer is the result of the bombardment of the walls by the molecules of the gas, the velocity of motion of which is a measure of their temperature. When that motion becomes too small to measure, and the gas condenses to a liquid or a solid, the molecular motions in which are very small, another conception has to be introduced, that of orderliness of arrangement, which increases as the absolute zero of temperature is approached. The technique of research in these regions must lie outside the scope of this lecture.

Faraday's Researches

The Science Museum itself illustrates the fact that the marvels of yesterday are the commonplaces of to-day, and the range of temperatures now referred to as "very low" only commenced at the point at which Faraday may have thought that further progress was impossible. All gases not liquefied at −110° C. were described by Faraday, less than a hundred years ago, as permanent. Forty years ago Dewar's work on liquid hydrogen was one of the wonders of the time. To-day liquid oxygen is delivered daily to most laboratories, and is one of the commonest and most useful reagents which the research chemist employs. The work of these early explorers is none the less remarkable.

Faraday's researches at the Royal Institution led to the liquefaction of all known gases except oxygen, nitrogen, hydrogen and carbon monoxide. In the sixties, Andrews, of Belfast, showed that there was a critical point for each gas above which it could not be liquefied, and in the seventies Van der Waals gave a physical explanation to Andrews's work. At the same time the work of the Swiss engineer, Pictet, on continuous refrigeration, gave a tremendous impetus to research at low temperatures. In 1877 Pictet and Cailletet showed independently that if oxygen was compressed, cooled to −140° C. and then allowed to expand, at least a mist of

drops of liquid was produced. It was thus demonstrated that oxygen could be liquefied, an important advance in knowledge. In 1895 the Polish chemist Olszewski showed that hydrogen could be liquefied in the same way. In 1905 the lecturer planned a similar experiment with helium, but he left for India before it was completed, and all that remains is a lantern slide made for a lecture to his students in the Bristol University College at the time. These experiments were essentially exploratory, aimed at obtaining information which would make it possible to liquefy the gases on a large scale.

Liquefaction of Oxygen by Dewar

Dewar's first experiments followed on those of Olszewski, and he succeeded in obtaining as much as 25 c.c. of the liquid. About the same time he invented the Dewar flask, which, in itself is an outstanding contribution to low temperature investigation. Dewar now attached the problem of liquefying oxygen boldly, and he built a plant based upon the work of Pictet. He then succeeded in producing liquid oxygen in very large quantity.

The next stage in the history of low temperature research begins with the work of Linde in Germany and of Hampson in England, who patented a continuous process for liquefying gases by what is known as the "method of free expansion," embodying the principle discovered by Joule and Lord Kelvin. Hampson, with the co-operation of the late Mr. K. S. Murray, of the British Oxygen Co., Ltd., developed the well-known Hampson apparatus, which has been for over thirty years the source of most of the liquid air used in scientific laboratories.

The same principle was first applied by Dewar to the liquefaction of hydrogen. In this case the gas, if simply compressed and allowed to expand, would become continuously hotter and not colder. The hydrogen had first to be cooled to liquid air temperature, and if it was then allowed to expand, it became cooler and liquefied. Dewar built a large apparatus at the Royal Institution, and about the year 1898-99 was producing litres of liquid hydrogen. In the year 1900, the work on the rare gases, on which Sir William Ramsay and the lecturer were engaged, could not be finished unless some liquid hydrogen could be obtained to purify neon from argon and helium. It fell to the lecturer to design an apparatus for the purpose. The apparatus has now found a home in the Museum. It is the first apparatus for liquefying hydrogen of which the details have been described in literature. Its chief merit was its cheapness, for it only cost a few shillings, and it worked very well. It travelled to Berlin in 1903 in his personal luggage, and gave the first demonstration of the liquefaction of hydrogen on the Continent. A very similar apparatus was used for liquefying helium by Kamerlingh Onnes in Leyden in the year 1908.

Isolation of Krypton and Xenon

In May, 1898, Dr. Hampson brought some liquid air to University College for Ramsay, but had never handled liquid air before, and he did not neglect the opportunity of carrying out what, to him, was an obvious experiment. The liquid was allowed to evaporate almost completely. The last of the gas was then collected, and from this, after removing the oxygen and nitrogen by chemical means a small quantity of inactive gas was obtained, which might have been expected to be merely argon. However, on spectroscopic examination it was found to show brilliant green and yellow lines, which must belong to a new gas. From these last fractions of liquid air two new gases, krypton and xenon, were separated.

THE first experimental plant in the Soviet Union for the manufacture of alcohol from peat by a process invented by a young White Russian scientist has just been built at Minsk. Output will be 100 litres of industrial alcohol daily.

I.C.I. Capital Reduction Scheme

Court Reasons for Dismissing the Appeal

THE reasons for dismissing the appeal of the deferred shareholders of Imperial Chemical Industries, Ltd., from the decision of Mr. Justice Eve were stated by the Court of Appeal on Wednesday. Mr. Justice Eve's decision had confirmed the reduction of the company's capital from £95,000,000 to £89,565,859. The appeal was heard on March 12.

The judgment was read by Mr. Justice Clauson, who dealt with the objections taken by the appellants in the Court of Appeal. The first objection was that on the true construction of article 44 of the company's articles of association the company had not taken power to reduce its capital by cancelling, in the manner proposed, the £5,500,000 of deferred share capital. In the opinion of the court, on the plain meaning of the words used, the company took power to reduce its capital in any way in which it was, under the statutes, authorised so to do.

The second objection related to the alteration in the rights of the two classes of shareholders, which under the articles required the assent of the shareholders in each class. It was suggested on behalf of the appellants that no separate meeting of the holders of the deferred share capital was held, and that, in so far as the reduction of capital would affect their separate rights, it must be treated as invalid. In the opinion of the court there was no foundation for the suggestion that a class meeting could not be treated as a separate meeting of the class if at such a meeting there were in fact present persons not belonging to the class. The convenience of dealing with the matter of meetings as it was dealt with in this case was obvious, and it was not easy to see how, without grave inconvenience, the meetings could otherwise have been held. The appellants' second objection failed.

The third objection was that the circular issued by the directors with the notice of the meeting was inadequate. Mr. Justice Eve had pointed out—and it was made clear to the Court of Appeal—that no want of good faith or coercion or overreaching on the part of the company or its directors or other agents, and no misrepresentation, concealment, chicanery, or deceit was suggested. With regard to the suggestion that the circular was inadequate, the court saw no reason to differ from the conclusion of Mr. Justice Eve, which was, that no reason for the refusal of confirmation to the reduction resolution could be properly based on any criticism of the directors' circular.

The fourth objection was that the scheme was one which the court ought not to approve. After careful consideration of the long and detailed analysis of the position placed before the court by counsel, it appeared to the court that the question whether it was worth while for the respective classes to accept the modification of their rights proposed to be effected by the reorganisation of the capital was eminently the type of question in regard to which it was true to say that shareholders acting honestly were much better judges of what was to their commercial advantage than the court could be. No material had been placed before the court in this case to justify the suggestion that the decision to which the majorities of the respective classes had come was a decision which, having regard to well settled principles, the court could overrule. The court had accordingly dismissed the appeal with costs.

THE Dansk Sojakagefabrik A/S, Copenhagen, manufacturers of oilcake, soap and vegetable and animal oils and fats for edible and technical purposes, recently commenced production of caustic soda and caustic potash for its own consumption. It also produces liquid chlorine for export to Finland, for use by the pulp mills. Plans are being made for the production of bleaching powder. The Danish paper industry uses approximately 1,000 metric tons of bleaching powder yearly, most of which is imported from England, Germany and Russia.

Some Problems of the Coke Oven Industry

Future Organisation and Expansion

Dr. G. E. Foxwell, F.Inst.P., F.Inst.F.

THE tendency to-day is in the direction of nationally organised industries, replacing the individualistic concerns that flourished during the last century, and in the earlier years of the present one, said Dr. G. E. Foxwell, F.Inst.P., F.Inst.F., M.Inst. Gas. Eng., in a paper read before the Northern Section of the Coke Oven Managers' Association on March 26. No doubt the world went very well then, but since those days the world has changed.

The coke oven industry is still to a large extent composed of discontinuous units united only in so far as the coke oven owners happen to be also colliery owners. If this state of affairs could be changed and the coke oven owners could be blended into one trade organisation a very important result might accrue. The coke ovens have, in my opinion, too long been considered as part, and indeed subsidiary, to larger enterprises, either collieries or steelworks. It is time that it was realised that the coke oven industry has nothing in common with either of these except in so far as it relies upon one for its raw material and upon the other for a market for coke and often for gas. The coke oven industry is a chemical industry, and until it is given a life of its own and not kept tied to its mother's apron strings and its father's braces it cannot expand.

The attitude of different sections of the industry towards this matter of expansion varies. The coke oven owners do not mind in the least whether *as an industry* it expands or not. Why should they so long as their individual concerns are prosperous? Expansion means for them the probability of competition in the coke market. If controlled in the right way by trade associations, so that expansion of plant followed expanding markets, this objection would disappear. Many coal-owners disapprove of expansion on the ground that the coke made would displace house coal from the domestic grate. Steelworks do not appear to recognise coke ovens other than as a piece of ancillary plant, useful in assisting general fuel economy in steel making.

Development in Coal Processing

Another important result that might accrue from a trade organisation might be closer co-operation between the constructional firms and the operating concerns. For instance, the constructional firms of the gas industry, whether they build gasworks or cookers, are taken into the councils of the industry in every direction and are regarded as being part of the industry by which they live. The gas engineer is prepared to pay a fair price for a good article, in most instances without accepting or asking for absurdly low prices. The time is therefore ripe for recasting the structure of the coking industry so as to include all those who have anything to contribute to its well-being.

The most striking development in coal processing at the moment, a development designed to use more coal, is that of the production of oil from coal. If a mixture of gases made from coke in the proportion $CO + 2H_2$ is passed over a zinc-chromium catalyst at high pressures and at temperatures between 300° and 400° C. there is obtained a high yield of methyl alcohol. If the same mixture is passed over a cobalt or nickel catalyst at a temperature of 200° C. and at atmospheric pressure the result is the formation of a number of light hydrocarbons suitable for use as petrol; this is the Fischer process. Both of these processes are in large-scale operation on the continent; neither is in use in this country. Both are worthy of investigation.

The process that has been favoured in this country is hydrogenation, but the hydrogenation of coal is not a process that will appeal to those looking for pithead developments, although some rather wild statements have been made in support of that idea. The probable amount of motor spirit used in this country in 1936 will be 4,500,000 tons. The cost of putting up plant to make this quantity of spirit from coal by hydrogenation will be some £120,000,000 involving (according to authorities) 300,000 man-years of work. It is essential that if the production of oil from coal be embarked upon from considerations of national safety, it should be done in time of peace. The annual cost to the nation will be the cost of this quantity of petrol at 2¼d. a gal., or a loss of just over £12,500,000. In order that the country may be able to make this annual loss the Government has arranged to give a subsidy of £6,000,000 for the production of the first 150,000 tons of synthetic petrol per year.

From the point of view of employment and of national defence it is difficult to defend large-scale hydrogenation. At the Institute of Fuel meeting Professor Bone and others pointed out that to produce 100,000 tons of petrol per year by hydrogenation requires some 3,200 men with a well-designed plant. To produce our 1916 requirements would require about 100,000 men—a small army in itself. That would be a disadvantage in time of war, but it would be no advantage in time of peace. The nation would pay £12,500,000 a year to keep 100,000 men employed (including miners)—£125 per man. In time of war the petrol consumption would increase enormously, so that this plant would not be large enough; the man-power required would be against the proposal; the works would be a target for every enemy bomber.

A Vast Oil Storage Scheme

For a capital expenditure of under £1 a ton, all the oil required could be stored in tanks in this country. The coke oven industry knows something about the storage of oil, so why should not coke oven concerns undertake oil storage for the Government? The plant could be laid down for a fixed sum, and the coking concern would receive a fixed amount of oil for which they must account at each annual stocktaking. In return an annual fee would be paid by the Government for expert technical services. Three years' supply of oil of all grades could be stored for about £20,000,000—without any annual loss other than the interest on this sum and the storage fee plus loss due to leakage and evaporation.

Hydrogenation of coal is not a pithead proposition; that is certain so long as the present process is the best we can do. Hydrogenation of tar, however, is another matter. The Fuel Research Board is working upon this problem of tar hydrogenation, and if they can (as seems likely) evolve a simple continuous plant that will enable tar to be hydrogenated by using the gases evolved during the last two or three

hours of the coking period—gases which consist largely of hydrogen—the hydrogenation of tar should be brought within the normal functions of every coke oven plant. The major cost would be for plant; for the simple treatment of tar alone that should not be excessive. With a continuous plant, operating costs would be low. The chief cost of all, hydrogen, would be eliminated, except for the cost of compression.

As an example, when 1,920 lb. of tar was hydrogenated at H.M. Fuel Research Station (cf. Fuel Research Board report on "The Hydrogenation-cracking of Tars.—Part I." p. 84), 22,100 cu. ft. of hydrogen was used having an initial c.v. of some 67 therms. At the conclusion of the test the residual gas consisted of 10,000 cu. ft. having a thermal content of some 40 therms. The residual gas was, and this is the important fact, under a pressure of 200 atmospheres.

Tar Hydrogenation

One ton of coal yields in the coke oven some 90 lb. of tar, which requires 1,040 cu. ft. of hydrogen contained in the gases from the last part of the carbonising process. Probably some 1,500 cu. ft. of total gas would have to be compressed for the hydrogenation plant to provide this quantity of hydrogen. The resulting gases would consist of $\left(1{,}040 \times \frac{10\,00}{22.1} + 460\right)$ = 930 cu. ft. under a pressure (allowing for some loss on release) of 150 atmospheres. This, when added to the whole of the remaining gases from the coking plant, say, 11,000 cu. ft. per ton of coal, would yield 11,930 cu. ft. of a c.v. somewhat higher than would otherwise have been obtained, and under a pressure of 12.5 atmospheres, or over 180 lb. per sq. in. It will be noted that the cost of compressing the coke oven gas will be borne by the hydrogenation plant, since compression is an unavoidable part of this process.

Coke should be improved by reducing its ash content and making it more combustible by retaining some volatile matter. Sales of coke should be encouraged by organised effort in concert with the gas industry. The tar should be hydrogenated, using the end gases from the carbonisation process to provide the hydrogen. The possibility of selling more gas should be taken care of by installing combination ovens which can be heated by producer gas when the oven gas is sold. The pressure in the residual gas from tar hydrogenation should be utilised to obviate the need for compressing the oven gas for transmission. Regarding ammonia, the coking industry should conduct its own researches upon the possibilities of making and marketing ammonium carbonate as a fertiliser.

A Better Benzole Yield

It is clearly possible, continued Dr. Foxwell, to obtain far more light hydrocarbon spirit than the benzole yield now obtained. Turning to the present practice of benzole recovery, he suggested that while we make excellent creosote wash oil of our own, it seems a pity to bring wash oil thousands of miles from other countries. He knew the arguments used in some quarters in favour of gas oil, but believed that, by proper processing of creosote wash oil, these arguments could be nullified, particularly since the work of the Benzole Research Association has shown that the absorptive capacity of creosote wash oil of good quality is some 1.5 to 1.8 times that of gas oil.

To illustrate this point he dealt with just two of the properties of a good benzole wash oil—absorptive capacity and rate of absorption. When benzolised gas and wash oil are left in contact, the oil will go on absorbing benzole until the vapour pressure of the benzole in the oil equals that of the benzole in the gas. The equilibrium quantity of benzole in the oil corresponding to some arbitrary concentration of benzole in the gas is the "absorption capacity." In commercial practice, it is not possible to allow an unlimited time of contact, so that equilibrium is never reached; "rate of absorption" thus becomes of the highest importance.

The absorptive capacity depends largely upon the molecular weight of the oil, as is shown by the following figures:

Molecular weight of wash oil.	Absorptive capacity grm. benzene/100 grm. solution.
400	2.0
400	3.5
150	4.8
100	7.0

Low molecular weight is therefore of importance; if the oil thickens in use the molecular weight is greatly increased and the absorptive capacity is decreased. The lower boiling oils have in general the lower molecular weight.

The rate of absorption is the resultant of three factors: (a) It is directly proportional to the difference between the vapour pressure of the benzole in the oil and that of the benzole in the gas. Since the vapour pressure of benzole "dissolved" in wash oil depends upon the molecular weight of the oil, it is evident that low molecular weight is favourable to high velocity of absorption. (b) It is directly proportional to the surface of oil exposed to the benzolised gas. (c) Since absorption takes place in the surface layers, it follows from (a) that the rate of absorption is proportional to the rapidity with which the surface layers of the oil mix with the inner layers, so as to expose a fresh oil surface, containing a lower concentration of benzole, to the gas as soon as possible.

Problems of Wood Utilisation

Visit to the Forest Products Research Laboratories

In connection with the second international conference on timber utilisation and research, organised in London by the Comite International du Bois, Department for Timber Utilisation, in conjunction with the Timber Development Association of the United Kingdom, a party of delegates representing twenty-two nationalities visited the Forest Products Research Laboratory, of the Department of Scientific and Industrial Research at Princes Risborough, Bucks, on Wednesday.

In the course of their tour of the laboratory they were shown experimental kilns which have been under investigation for the drying of timber by artificial means; plant used for experiments on the impregnation of timber with creosote and other preservatives; and appliances used in investigating the serviceability of packing cases, special means being adopted for reproducing the various types of damage resulting during transport. A special display of fungoid growths affecting timber under service conditions was staged, with special reference to the so-called "dry-rot." Experiments were in progress to determine the fire resistence of timber by submitting test pieces to the action of a standardised flame and observing the rate at which the flame penetrates the wood; other experiments of a similar nature were made with the object of finding the rate at which flame would spread over a vertical surface of timber. Problems which are receiving investigation at the laboratory are many and varied. They include such things as the effect of sap stain on the toughness of timber, the resistence which is offered against surface wear (as in the case of floors), and damage by pressure or impact.

Uses for Waste Wood

Papers which were read at the meeting of the conference on Friday were devoted especially to the subject of wood waste utilisation; they included "Wood Gas Problems" (M.Ch.Colomb, Inspecteur General des Eaux et Forets, and Professor A. Kyrklund, Technical High School, Helsingfors); "Wood a new raw material in modern chemistry" (Dr. Friedrich Bergius, Heidelberg, Professor E. Hagglund, Technical High School, Stockholm, and Dr. Ing. J. A. Duiker (member of the board of the International Alcohol and Sugar Co., The Hague); and "Wood as Fuel" (Ing. E. Harlin, Ingeniors Vetenskaps Akademien, Stockholm).

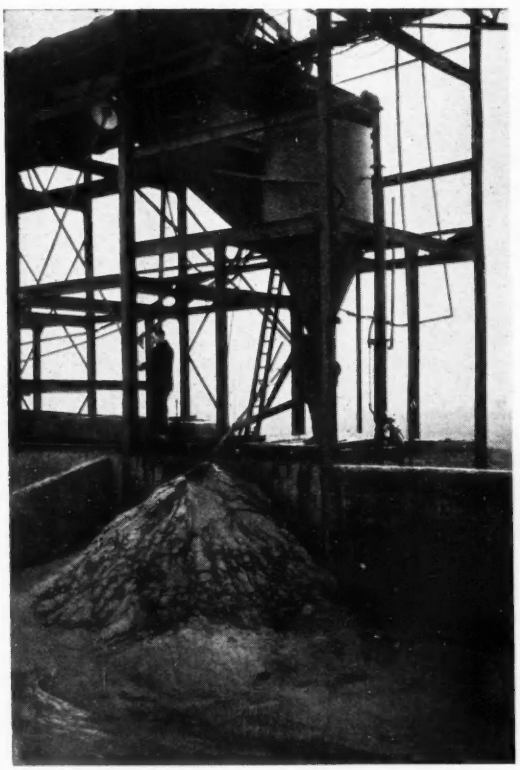
Hydraulic Separation of Materials

Principle of the " Sy-Vor " Classifier

AN interesting demonstration of the principles and operation of the " Sy-Vor " classifier, made by the Key Engineering Co., Ltd., was given to a party of technical Press representatives on March 19. Mr. Leonard Andrews, the company's consulting engineer, first exhibited a series of working models and showed the features of the classifier at his laboratory at Pinner, and the visitors afterwards proceeded to the pits of the St. Albans Sand and Gravel Co., Ltd., at Smallford, which, as a result of the cumulative experience gained at the St. Albans company's other workings, have been equipped with the most modern plant available for the handling, grading and efficient washing of concrete aggregates.

Although at Smallford the 5 ft. " Sy-Vor " classifier installed by the Key Engineering Co. is used only for the separation of a large quantity of clay and other impurities from the fine sand aggregates, such classifiers, of varying capacities, are applicable to a wide variety of purposes in the chemical industry, such as in the manufacture of abrasives, pigments, fuller's earth, whiting and many other products in which the material can be passed through water, and in the separation of the fine contents of ground flint for pottery manufacture.

Hydraulic separation is simple and effective because classification by water is a natural process. Its basic principles as applied to industrial processes are those of maintaining a correct relationship between the mass and size of the material to be removed and the velocity of the water in which it is to be carried, and the complete surrounding by water of individual particles. The apparatus designed by Mr. Leonard Andrews has no moving parts, the actual separation being carried out automatically by the flow of water, which is given a vortex movement, and the automatic control being effected by a siphon device, hence the name " Sy-Vor."



Continuous discharge of clean sand from the " Sy-Vor " Classifier at the Smallford pits of the St. Albans Sand and Gravel Co., Ltd.

The surface area of the washed ballast with which the classifier at Smallford has to deal is 90 sq. ft. per cu. ft., whilst the surface area of fine sand is 2,000 sq. ft. per cu. ft. Capillary attraction, proportional to surface area and inversely to distance between individual particles, must be counteracted to release fine material and to maintain fluidity of sands. " Quick sands," an example of perfect classification, settle to a rigid mass in standing water. Rising streams of water through sands cut channels, but do not break down mass capillary attraction. The high velocity scouring action above the settled sand bed in " Sy-Vor " classifiers, induced by the high pressure vortex diffuser lifts the individual sand particles from the sand bed surface whilst the escaping scouring water carries away the released fine particles.

A small vortex diffuser was inspected at Pinner suspended in air 5 ft. above the ground, discharging 1 gal. per min. in a uniform parabolic film. The diameter of the base of the parabola was approximately 5 ft. The horizontal velocity of the film leaving the diffuser under these conditions was between 8 ft. and 9 ft. per sec. The thickness of film immediately after leaving the diffuser was computed to be approximately 15/1,000th of an inch. At slightly less than 1 ft. dia. the thickness of the film reduced to 1.3/1,000th became unstable and broke up into small droplets which continued to fall in the same parabolic formation.

An identical diffuser submerged in a 4 in. dia. beaker of water imparted a rotary motion to the water in the beaker. Under the combined influences of the high velocity horizontal stream and the rotary motion induced by this stream, an area of low pressure is created having a maximum depression directly below the centre of the diffuser. This induces a rising stream of water over the entire area other than closely adjacent to the container walls. In the centre of the vortex, with 1 g.p.m. diffuser discharge, the rising velocity exceeds 1½ ft. per sec. This was demonstrated by repeatedly lifting a 1 in. dia. glass marble from the bottom of the beaker 4 in. below the diffuser outlet. (The falling velocity of a 1 in. glass marble in still water is 1½ ft. per sec.)

In " Sy-Vor " classifiers, in addition to scouring the sands, the high pressure diffuser maintains the underside of the sand bed in a state of fluidity and prevents central coring.

Low pressure vortex diffusion has proved a remedy for the directional short circuit streams induced by the momentum of the entering feed into classifiers and settling tanks. It was shown by means of a submerged inlet 2 in. distant from an overflow sink in a 12 in. × 10 in. glass-fronted tank that an inlet momentum of less than 400 cgs. units, directed away from the sink, induced a flow completely round the tank (41 in.) in preference to the direct flow of only 2 in. from source to sink. In " Sy-Vor " classifiers uniform vortex diffusion is induced over the entire low velocity area by means of tangential feed jets.

The body of a typical classifier is in the form of a cylinder with a dished top and a conical base, the latter being removable at will. The apex of the conical body is detachable and terminates in a cock. The washed sand is discharged through the cock. The effluent, containing the clay removed from the sand, is discharged by way of the branch on the dished top through the siphon. The water-borne sand to be washed is introduced into the body of the classifier by two pipes arranged tangentially. A smaller pipe runs from the top branch piece to the apex of the conical body and terminates in a nozzle of special form.

The water carrying the sand to be washed enters the lower part of the body at a high velocity owing to a restriction of the area of the tangential pipes by means of a nozzle formed with a slit. The volume is kept constant by the auto-

matic regulation of the actuating head. The classifier when in operation is full of water, but the state, as regards movement, varies considerably in the different parts. The water entering at a high velocity sets up rotation in the mass in the lower part, and in doing so any aggregation of sand and clay particles is broken up at points close to the nozzle by an impact effect. The particles are separated and dispersed individually through the mass of water. Separation of the oversize particles then commences. Owing to their greater mass they are carried outwards by centrifugal force to the wall of the classifier down which they slide to the cone apex. The vortex set up by the swirling mass has a double effect: it creates turbulence which causes effective scouring of the particles and sets up a radial flow inwards due to the lower pressure at the centre of the vortex. This flow carries the intermediate and lighter particles into the annular space between the cones. In this space the swirl is checked by radial divisions and the flow continues towards the centre. The major part of the intermediate particles is deflected downwards between the cones and joins the coarser material at the bottom. A small percentage is, however, carried along with the fine material, *i.e.*, the clay, into the bottom part of the upper half of the classifier in which the water rises upwards in vertically ascending sheets, at a continually decreasing velocity due to the increasing area presented by the bounding cone. This velocity is only sufficient at the top of the cone to carry the fine particles, and the intermediate particles gravitate downwards through the annular opening between the small cone and the inner cone to join the oversize at the apex.

Operating a Classifier for Sand

The water containing the fine material is drawn off at the top of the classifier by a siphon pipe which is provided with a regulating cock at the bottom. Sand is discharged continuously, and at such a rate that there is always a small bed of it in the bottom of the classifier. The sand requires some water to make it flow away; usually about one part of water to two parts of sand by weight is sufficient. The normal rate of discharge is determined by adjusting the opening of the cock and by setting the hydrostatic head to suit. It is possible for the sand to be deposited at slightly varying rates, and, in consequence, an accumulation of sand may take place on the bed. The first effect of an abnormal increase of sand is to reduce the fluidity of the discharge, and the resultant decrease of velocity of flow tends to increase the depth of the bed rapidly. As, however, the total volume of material entering the classifier is constant, any reduction in the volume of the same discharge must result in a corresponding increase in the volume of discharge from the siphon. The siphon outlet cock being permanently set for normal working, this increase immediately results in a rise in the water level of the siphon pipe tank, *i.e.*, the effective length of the siphon pipe is reduced, and the hydrostatic head at the discharge cock is increased. The augmented head then increases the velocity of discharge and the accumulated sand is got rid of at a quicker rate than normal, the action continuing until the normal balance is again obtained. Any reduction of the sand bed below the normal level sets up reversed conditions: in any case, even with no sand being discharged, the quantity of water escaping is only slightly in excess of the mean volume of the sand water discharge.

Grading a Mixture into Two Sizes

The classifier and precipitation tank can be used as a complete installation when the operation to be undertaken is that of grading a mixture into two sizes in a de-watered condition, one of which is discharged at the classifier outlet and the other at the precipitator outlet. If the classifier is used for sizing by itself, only the coarser material is delivered de-watered. Again, the classifier may be used for removing coarse material from a mixture in order to leave a uniform fine material in suspension in the outflow from the siphon pipe. The classifier is capable of a very wide variety of uses. The principle adopted is the same in each case, but there are naturally differences to be made in the velocities of the main supply, clear water supply, discharge, etc.

At the Smallford works the raw material is excavated by a No. 21 Ruston Bucyrus drag line excavator and discharged into an overhead hopper which feeds a train of skip wagon. The loaded wagons are shunted up a ramp and tipped to a hopper feeding a pool belt conveyor. The conveyor feeds a 1½ in. mesh screen, the oversize passing to the Goodwin and Barsby jaw stone crusher, the undersize joining the crusher discharge to be re-elevated by a second pool belt conveyor to a four-barrel pool contraflow washer. Here some 300 gal. per minute of clay effluent and fine sand are washed back to the "Sy-Vor" classifier feed tank, while the shingle and coarse sand pass through the washer to a set of four-barrel pool screens. The sharp sand is fed to two Rickoff sand wheels for de-watering and the shingle is separated into graded sizes and passed to storage bins.

The fine sand in the clay effluent is concentrated in the classifier feed tank and enters the classifier through tangential inlet jets at a velocity of about 25 ft. per sec., where it is thoroughly washed and treated.

Imperial Chemical Industries, Ltd.

Final Dividend for 1936

THE Directors of Imperial Chemical Industries, Ltd., announce that the net income for the year 1935, after providing £1,000,000 for central obsolescence and depreciation fund and £645,891 for the company's income tax, amounts to £6,706,539 as against £6,349,107 for 1934, or an increase on 1934 of £357,432. With the balance brought forward from 1934 of £608,451 the total balance is £7,314,990. After providing £1,590,738 for the dividend on the preference shares and £1,093,994 equivalent to 2½ per cent. interim dividend on the ordinary shares, paid on November 1, 1935, the directors have appropriated £1,000,000 to general reserves, £217,366 to contingent dividend reserve, and £150,000 for the workers' pension fund.

As a final legal decision on the scheme for the reorganisation of the company's capital may not yet have been reached, the directors have decided to recommend a final dividend on the £43,759,759 ordinary stock, resulting from the conversion into stock of ordinary shares, of 5½ per cent., making 8 per cent. for the year, and, on the further £5,434,141 ordinary stock (resulting from the conversion and consolidation of 21,736,564 deferred shares of 10s. each) a dividend of 4 per cent, both less income tax at the standard rate for 1936/37 (reduced by relief in respect of Dominion income tax at the rate of 4d. in the pound). This latter dividend of 4 per cent. is equivalent to a dividend of 2 per cent. on the 21,736,564 former deferred shares of 10s. These dividends which will absorb a total of £5,308,884 and leave a balance of £638,740 to be carried forward to 1936, will be payable on June 1 to stockholders on the register at April 18. For the purpose of payment, transfers must be lodged at the company's registered office not later than April 17.

The directors have also decided to recommend, contingently on the time for appealing to the House of Lords against the decision of the supreme court confirming the company's reduction of capital expiring without an appeal being lodged, or the House of Lords refusing leave to appeal, or on any appeal so lodged confirming the existing decision of the supreme court, a further dividend on the said £5,434,141 ordinary stock of 4 per cent. With the dividend of 4 per cent. recommended, this contingent dividend, if paid, will make the full 8 per cent. on the £5,434,141 ordinary stock, which results from the conversion and consolidation of the former 21,736,564 deferred shares of 10s. each. The contingent dividend reserve of £217,366 will be sufficient to pay this dividend.

The ninth annual general meeting of the company will be held on Monday, April 27, at 11.30 a.m. at Queen's Hall, Langham Place.

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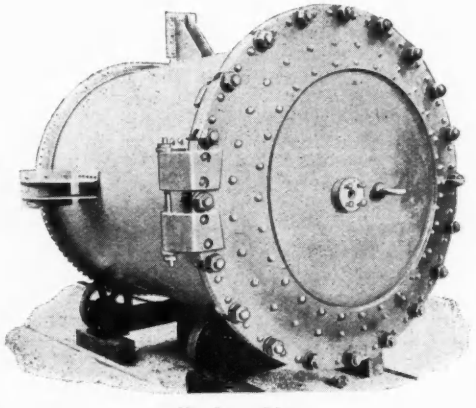

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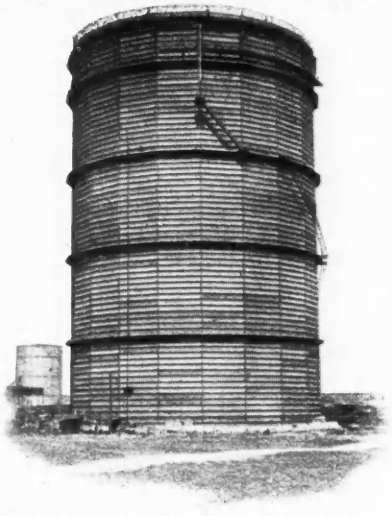

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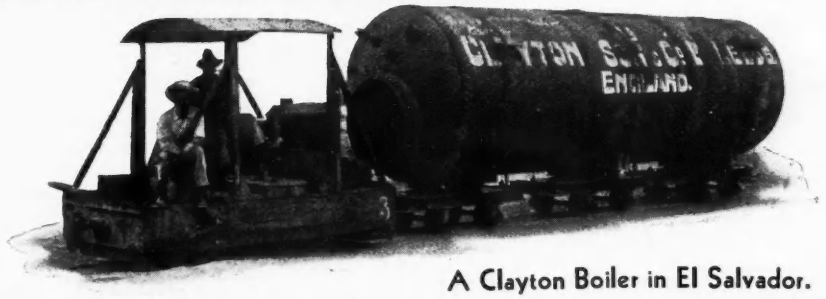

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The Oil and Colour Chemists' Association

Annual Dinner and Dance

THE members of the Oil and Colour Chemists' Association held their 18th annual dinner and dance at the Trocadero Restaurant, Shaftesbury Avenue, London, W.1, on March 27. Members and guests were received by the President of the Association, Mr. G. A. Campbell, M.Sc., and Mrs. Campbell; and Mr. Campbell presided during dinner. The company included Mr. W. A. S. Calder (president, Society of Chemical Industry), Mr. H. G. Dowling (past-president, Incorporated Institute of British Decorators), Mr. H. D. Elkington (vice-president, Institute of Chemistry), Mr. G. Copping (hon. editor to the Association), Mr. A. J. Gibson (hon. secretary), Mr. H. Gosling (hon. secretary, Manchester Section), Mr. S. Romilly Hall (chairman, Paint Marketing Council), Mr. Noel Heaton (past-president) and Mrs. Heaton, Dr. V. G. Jolly (chairman, Manchester Section), Dr. L. A. Jordan (director, Research Association of British Paint and Varnish Manufacturers) and Mrs. Jordan, Dr. H. Levinstein (president, Institution of Chemical Engineers) and Mrs. Levinstein, Sir Harry Lindsay (director, Imperial Institute) and Lady Lindsay, Major J. G. G. Mellor (vice-president, Paint Research Council) and Mrs. Mellor, Mr. J. Milligan (vice-chairman, Scottish Section of the Association), Dr. H. Houlston Morgan (past-president) and Mrs. Morgan, Dr. R. S. Morrell, Dr. G. F. New, Mr. R. B. Pilcher (registrar, Institute of Chemistry), Mr. J. A. Frome Wilkinson (past-president) and Mrs. Wilkinson.

Scientists and Non-Scientists

Sir HARRY LINDSAY (director, Imperial Institute) proposed "The Oil and Colour Chemists' Association." Whilst he was honoured to accept the duty, he warned the members of the Association jocularly that they were taking a great risk in asking a non-scientist to propose a toast to a scientific gathering. Non-scientists were perhaps apt to regard as commonplace the things which scientists considered holy, and even to commit the much greater crime of regarding with reverence and respect the things which the scientists considered to be trivialities and mere tricks of their trade. He could only claim to be a Pharisee of the Pharisees, for science had never entered into his composition or his education; indeed, he had passed through the ordinary mill of what might be called an all-round education—an education so completely circular that at the age of 18 years he had finished almost where he had started at the age of 8 years!

Work of the Imperial Institute

Sir Harry then indulged in a few reminiscences which led him ultimately to the important subject of the possibilities of co-operation between the Imperial Institute and the Oil and Colour Chemists' Association, bearing in mind that the Imperial Institute carried out a good deal of work on matters and materials of interest to the Association. One of its tasks was to investigate raw materials received from overseas, and a great many of those materials were of interest to the Association. For example, it had carried out a good deal of work on shellac, on tung oil and tung seed, on ilmenite and other materials which were of great interest to oil and colour chemists in their professional work. Therefore, he suggested closer co-operation between the two bodies. The Imperial Institute, he said, had material in its records and in its library which he felt sure would be of value to the Association, and he urged that both bodies could contribute something to the solution of Empire problems. Whatever one's profession, one was often too much inclined to take a narrow view of things; life had become so highly specialised that there was a great danger of following grooves and forgetting the bigger things which would lift us out of ourselves and out of our grooves. One of the considerations which inspired those concerned with the Imperial Institute was the Empire interest. They were investigating Empire materials in Empire interests, and the exhibits in the galleries were always representative and typical of some part of the Empire. He appealed for the co-operation of the specialities in organising some of the exhibits there; some 750,000 of the general public passed through the galleries each year, and the educational value of the exhibits, particularly to school children, was very great indeed.

Finally, Sir Harry congratulated the industry on the successes which had attended its efforts during the past few weeks, as evidenced in the Press. Although he had no intimate knowledge of those successes, he had observed the recent statements concerning international paints and compositions, and indestructible paints, and had noted that the gentleman whose name was either Mr. Pinchin or Mr. Johnson had been particularly successful, judging by the dividend that he had declared! On that note of success, Sir Harry proposed with pleasure the toast of the Association.

Co-operation in the Industry

The PRESIDENT, responding to the toast, commented on the unexpected turn which Sir Harry had given the word "co-operation," a word much used in the industry during recent years, and pointed out that the industry was fairly well organised so far. The National Federation of Paint and Varnish Manufacturers was looking after the interests of the industry, the Paint Club was looking after social activities, the Research Association was furthering technical knowledge, and the Oil and Colour Chemists' Association was helping in the propagation of that knowledge. But it was unexpected and interesting to be asked, as Sir Harry Lindsay had asked, to have regard to the tremendous amount of work which was going on outside the industry altogether with a view to attaining those objects which the industry was striving to attain; and it provided a perfect answer to those who had any liking at all for theories of self-sufficiency, indicating to them that such theories were entirely untenable in this world and that the work of one was dovetailing into the work of another.

Served by a Very Good Team

The President took the opportunity to express the Association's gratification in the fact that during the past few months Dr. J. J. Fox, a past-president, had been appointed Government Chemist. On behalf of the membership as a whole, he expressed hearty congratulations to Dr. Fox and best wishes for his continued success and well-being. Another personal matter to which the president referred was that Mr. C. A. Klein, another past-president, had been suffering from a serious illness during the past few months. He intimated that an expression of good wishes from the Association as a whole for a speedy recovery to health would be conveyed to Mr. Klein, now convalescent.

Inasmuch as his speech was in the nature of a swan song, for he would be retiring shortly from the presidency, after two years of office, Mr. Campbell took the opportunity to express his gratitude to members of council and other honorary officers for their excellent co-operation and for the wonderful manner in which they had worked for the Association. He could unhesitatingly assure the members that they were served by a very good team.

Mr. F. W. CLARK, B.Sc., A.I.C., proposing "The Guests," said that without the presence of the guests the Association's annual function would be far less inspiring; the members were proud to entertain so distinguished and representative a company. Their chief guest, he said, represented the Empire, from the various parts of which the Association's

members received many of their raw materials; and they hoped that the numbers and quantities of those materials from such sources would increase in the years to come. They had been particularly interested to hear Sir Harry Lindsay's appeal for co-operation. The members were also happy to welcome the presidents and other representatives of sister organisations of chemical engineers, chemists of all types, paint manufacturers and decorators. In the industry, each of those groups was complementary—and he trusted they were always complimentary—to each other. Until relatively recent times the manufacture of paint was an art, so that both painter and paint manufacturer had contended that the chemist was unnecessary—if, indeed, they had known of any chemist other than he who dispensed medicines in their localities. That the situation had since changed completely was shown by the flourishing Paint Research Station, and also by the fact that nowadays no paint manufacturer of repute was without at least one chemist in his organisation. Modern paint manufacture—using the word "paint" in its broadest sense—involved so many complex reactions that elaborate plant of widely differing type was required. In those circumstances, the services of the chemical engineer became assential.

The Aims of the Association

The aim of the Oil and Colour Chemists' Association was to embrace all those connected in any way with their great industry. It was a pleasure to welcome officials of the Manchester and Scottish Sections of the Association, and it was hoped that in the future the Association would have sections in other cities of the Kingdom. This function, he concluded, was the Association's annual party, and he felt that he was behaving as did the average youngster on such occasions, in leaving the most dainty morsel until last—the ladies!

Mr. S. ROMILLY HALL (chairman, Paint Marketing Council) responded to the toast. He had been told, he said, that if he talked about the Paint Marketing Council he would be ticked off, and that if he did not talk about it he would be ticked off. However, for the benefit of any who might not be fully aware of its activities, he said it was a body of people in the industry who were trying to make this country better and brighter by the use of more paint. Most people had seen the Council's advertisements and knew of the work it was doing publicly, but they were probably unaware of the good work that was going on also behind the scenes, and of the Council's contact with Government Departments and other big institutions such as the British railways. The Council was succeeding in making the public conscious of the value of paint, and it required encouragement and help. It had been stated at the last Executive Committee meeting of the Council that if the powers-that-be really got down to the problem they could quadruple the use of paint in this country; that would mean a great deal both to the oil and colour chemists' profession and to the paint industry. The Council had proceeded on the principle that if it could make a man or woman conscious of the value of paint in his or her own home, it would make them conscious also of the value of paint in whatever walks of life they might tread.

To anyone concerned with the commercial side of business the chemists were a great help, and they were also a great worry. Like other people, they varied. Once he had had the temerity to put a question to Dr. Jordan, who had shut him up at once by failing to answer the question and by talking about his (Mr. Romilly Hall's) inferiority complex. However, he had been able on one occasion to shut up a chemist, who had been talking in the way chemists were accustomed to talk, by reminding him of the words of Confucius: "When you know, and you know that you know, and when you don't know and you know that you don't know, that is true knowledge." It was apparent, he concluded, that the Association's guests were enjoying the evening; inasmuch as it was always better to give than to receive, the members of the Association were obviously enjoying a happy evening also. He congratulated them and thanked them for the hospitality extended to their guests.

The commendably short toast list was completed at a comparatively early hour, so that the members and guests were given plenty of time in which to enjoy the dancing.

Chemical Matters in Parliament

Palestine Potash

IN the House of Commons on March 24, Sir A. Knox asked the Secretary of State for the Colonies whether he was satisfied that the secret agreement between the Palestine Potash Co. and the Franco-German Cartel was in the best interests of this country, in view of the fact that the products of the Palestine Co. were mainly marketed in Great Britain and it was essential that the supply of potash fertilisers to Great Britain and the Empire should be free of German control.

In reply, Mr. Thomas said in view of its mandatory responsibility for Palestine and Trans-Jordan, His Majesty's Government must have regard to the interests of those countries, but he was satisfied that the agreement, while it was clearly to the advantage of Palestine and Trans-Jordan, was not injurious to this country. There was no question of the Palestine Co. coming under the control of the Continental cartel; on the contrary the agreement protected the company.

Oil Extraction by Bergius Process

On March 24, Mr. Whiteley asked the Lord President of the Council whether the experiment of extracting oil from coal by the Bergius process was still being proceeded with at the Greenwich research station; and what progress was being made.

In reply, the Lord President of the Council (Mr. Ramsay MacDonald) said processes for the production of oil from coal by hydrogenation were constantly under investigation at the Fuel Research Station, East Greenwich. Many modifications in technique had been made to the process originally formulated by Dr. Bergius. The progress of the work of the station was described in the annual reports of the Fuel Research Board.

In a further question, Mr. Whiteley asked whether the process was actually in use in any part of the country to-day.

In reply, Mr. MacDonald said it was the basis of the biggest undertakings that were going on.

Calcium Carbide Manufacture

On March 25, Mr. Chapman asked the Minister for the Co-ordination of Defence whether, in view of the importance of calcium carbide to the defence services and industries, especially in war-time, His Majesty's Government would take steps to ensure the establishment of an industry in the United Kingdom capable of producing the maximum quantity required.

In reply, Sir T. Inskip said the Government had not lost sight of the importance of ensuring supplies of calcium carbide both in peace and war. They would welcome any scheme to promote the manufacture of this material in the United Kingdom.

Mr. D. Evans then asked for co-ordinating influence to induce these firms to establish this industry in a distressed area where there was an ample supply of raw materials, including anthracite and limestone, an ample supply of power at reasonable cost and labour.

In reply, Sir T. Inskip said a very important question in

this connection was, what sort of power was available for the purpose in question.

Petrol and Spirit Storage

On March 25, Mr. Gardner asked the Secretary of State for the Home Department (1) whether, in view of a possible national emergency, he was giving any special attention to the dangers likely to arise from the present methods of storing petrol in bulk; and (2) whether, in view of a possible national emergency, he would consider making regulations forbidding the storage of white spirit and other inflammable spirit in tanks above ground.

In reply, the Under-Secretary of State for the Home Department (Mr. Geoffrey Lloyd) said the question of the protection of stores of oil under the conditions of national emergency was receiving the Government's attention, but he was not at present in a position to make any statement on the measures which would be recommended.

Petroleum (Productions) Act

On March 24, Mr. R. J. Taylor asked the Secretary for Mines how many licences had been issued to prospectors of natural oil.

In reply, Captain Crookshank said thirty-nine oil prospecting licences had been issued under the Petroleum (Production) Act, 1934.

Letters to the Editor

The Poisons Board

SIR,—The interesting letter of "Consultant" in THE CHEMICAL AGE of March 14 is welcome because, whilst we naturally disagree with some of its conclusions, your correspondent puts his case clearly and with great fairness.

He is, however, under some misapprehension. First, the British Association of Chemsts has not protested merely on the grounds that it has been excluded from the Poisons Schedule. Its thesis is that one body not representative of the whole profession of chemistry has been arbitrarily selected to represent the whole profession in the manufacture of certain poisonous compounds. Your correspondent ignores the fact that university graduates, as such, have been excluded, contenting himself with the observation that they can, if they choose, approach the Institute for election. We have not been alone in protesting against this provision which is detrimental to the profession as a whole.

Secondly, we regret that a letter, otherwise conspicuously fair, should be disfigured, no doubt through lack of information, with so gross an example of *suggestio falsi* as is to be found in the fourth paragraph. A candidate for admission to the Association does not require merely "some elements of scientific training." The wording of the rules on this point is perfectly clear. III 2 (b) reads: "*A sufficient general education and scientific training and at least seven years' practice in pure or applied chemistry with evidence of dependability and initiative.*" This has become in your correspondent's letter "seven years' experience in the chemical industry." We think the attention of your readers should be drawn to these examples of *suppressio veti* and *suggestio falsi*.

It has never been, and we never supposed it would be, questioned that this rule means that all candidates must show evidence of adequate training in the theory and practice of chemistry, and that this evidence must be confirmed by seven years' practice in a position of responsibility. The rules of the Association are published and therefore available to your correspondent. We suggest that had he read them he would have modified his statement that membership of the Association "is said to imply competence."

I think it should now be clear to your correspondent that the remaining paragraphs of his letter do not apply. Whilst we do not doubt that his criticisms of the Association's qualifications are made in good faith, they are founded upon premises which are manifestly inaccurate.

There is a further interesting point raised by your correspondent. He suggests that the B.A.C. has been excluded by reason of its registration as a trade union. This should, in fact, be a reason for including it. One of the functions of all trade unions is to ensure the competence of its members. Where no standard of competence, professional and ethical, exists efficient economic control is impossible. It may interest your correspondent to know that the average minimum salary paid to members of the B.A.C. is considerably higher than that which obtains outside its ranks.

The implication of the last paragraph of your correspondent's letter seems to be that the qualifications of the members of the B.A.C. will not bear the light of day. He hopes that it will lend its support to any movement which is a step towards "the weeding out of undesirables." This is a phrase which is naturally rather difficult to define, but we can assure him that the Association in the past has done, and in the future will continue to do, everything possible to ensure the unity of the profession and an increasingly high standard of competence of its members.—Yours faithfully,

HENRY T. F. RHODES,
Editor, "The Chemical Practitioner."
British Association of Chemists,
175 Piccadilly, W.1.

British Sugar Corporation

New Company to take over Fifteen Concerns

DETAILS of the scheme for the amalgamation of the beet sugar companies, provided for in the Government's Sugar Industry (Reorganisation) Bill, are given in a White Paper issued on March 26. The British Sugar Corporation, the company to be formed to amalgamate the fifteen existing companies, will have a share capital of £5,000,000. To provide working capital, the transferor companies will take up for cash an issue of £750,000 debentures, guaranteed by the Treasury.

The original cost of the existing factories was £9,400,000, which, if depreciated at 5 per cent. per annum, gives a present-day value of £6,100,000. The arrangements provide that the authorised amount of the loan capital shall be £1,000,000, but only £750,000 will be issued in the first place. This issue will be made immediately upon the formation of the corporation, and the terms and conditions, including the rate of interest and the price of issue, will be subject to the approval of the Treasury, provided that the price of issue is not more than the estimated market value of the Debenture stock at the date of issue. Since State assistance in future is to be calculated annually as a deficiency payment to fill the gap between the Corporation's income and outgoings, some incentive to secure a sustained effort to reduce working costs is provided. This incentive will be secured by an agreement between the Minister and the Corporation as to the division between the State and the Corporation of savings effected. The share retained by the Corporation of the savings made in any year will decline as time goes on, but the bigger the saving the more gradual will be the decline. The effect of the proposed agreement will be, for example, that if the corporation were to save £2,350,000 in the aggregate over a period of ten years, the Treasury will benefit to the extent of £1,600,000, or 68 per cent. Save in exceptional circumstances, and subject to the prior approval of the Sugar Commission and the Government, the rate of dividend will not exceed 7 per cent. per annum.

Personal Notes

MR. RICHARD TAYLOR has retired after over fifty years' continuous service with British Glues and Chemicals, Ltd. At the Newark branch of the company last week Mr. Vincent Cotes presented Mr. Taylor with a cheque for £100. A further gift of two easy chairs and a settee was presented by Mr. E. J. Gardiner, manager, on behalf of all the employees.

MR. JOHN MASSON GULLAND, M.A., D.Sc., of Edinburgh, has been appointed to the Sir Jesse Boot Chair of Chemistry at University College, Nottingham, in succession to Professor F. S. Kipping, who is retiring at the close of the present session. Dr. Gulland, son of Professor G. L. Gulland, formerly Professor of Medicine and consulting physician in Edinburgh, has carried out research work at the Universities of St. Andrews and Manchester.

MR. J. W. GOLSBY, M.B.E., principal officer of the Department of Overseas Trade, gave a talk on "Government Assistance to Export Trade" at a meeting of the Institute of Export at 21 Tothill Street, Westminster, on Tuesday. The Department, he said, has detailed information concerning leading agents in most markets of the world, together with a note of their ability to sell United Kingdom products. Last year it received 100,000 telephone inquiries, 13,000 personal calls and 360,000 letters.

MR. KLAUS W. ELIEL will be presented with the silver medal of the Institution of the Rubber Industry at a meeting of the Institution at the British Empire Club on Monday evening for his paper on "The Critical Temperature of Acceleration." MR. E. J. MAY and MR. J. M. WRIGHT will also receive bronze medals for their papers on "Rapid Tensile Testing with the Eccentric Schopper Ring" and "The Vulcanisation of Rubber with *m*-Dinitrobenzene" respectively. The three papers were selected from those submitted for the Institution's junior papers competition.

MR. WALTER SHERWIN COTTINGHAM, of Woolley Hall, Maidenhead, vice-chairman of Lewis Berger and Sons, Ltd., paint manufacturers, who died on January 22, aged 39, left estate of the gross value of £217,318 (net personalty £130,116).

PROFESSOR PLANCK, head of the Kaiser Wilhelm Society for the Promotion of Science, actively supported Herr Hitler at the recent election in Germany.

MR. ALLEN CARMICHAEL, manager of the Glasgow branch of David Moseley and Sons, Ltd., died on March 27. Mr. Carmichael was with the firm for 61 years, having joined in 1875. He was appointed manager at Glasgow in 1897 and continued his duties until a week before his death.

MR. WILLIAM B. CUTHBERTSON, a director of Daniel Wyllie and Co., Ltd., fertiliser manufacturers, etc., Ayr, died on Sunday at his residence, Dunalistair, Ayr. He was well known in business circles in the West of Scotland and was one of the founders of the firm 60 years ago. He was in his 88th year and leaves one son.

SIR JOSEPH ERNEST PETAVEL, director of the National Physical Laboratory, died on Tuesday at Bushy House, Teddington, aged 62. Born in London, he was only 35 when he was appointed Professor of Engineering and director of the Whitworth laboratories in the University of Manchester. During the 11 years he was at Manchester he carried out the work on the attainment of high pressures which was to represent his most important original contribution to physical science. He was a member of the Advisory Committee for Aeronautics formed in 1909, and of the body which succeeded it, the Aeronautical Research Committee. Of this committee he was vice-chairman until his death. It was in 1919 that he became director of the National Physical Laboratory at Teddington, which had just been taken over by the Department of Scientific and Industrial Research. In 1907 he was elected a Fellow of the Royal Society.

Continental Chemical Notes

Poland

THE ITRON CHEMICAL WORKS has now commenced manufacture of bismuth tribromphenylate.

Jugoslavia

THE SIAL COMPANY of Laibach are building a factory for making antirusting paints at Borovnica.

Belgium

WORK IS UNDERSTOOD TO HAVE STARTED on the building of a new calcium carbide plant at Tilleur by the Société Engrais et Produits Chimiques de la Meuse.

Iceland

ACCORDING TO A COPENHAGEN REPORT (quoted in the "Chemische Industrie"), a new enterprise for production of fish oil and meal will commence operations next autumn at a factory in Seydisfjord.

Italy

THE MONTECATINI CONCERN made a net profit of 67.48 million lire in 1935, as against 66.97 million lire in 1934, and is increasing its dividend from 8 to 8.5 per cent.

ITALIAN STOCKS OF COPPER are sufficient, it is officially claimed, to cope with the agricultural demand for copper sulphate in the coming season.

THE SNIA VISCOSA achieved a net profit of 34 million lire in 1935 (26 millions in 1934) and is distributing a dividend of 16.5 lire per share. Rayon output at 21 million kilos was maintained at the previous year's level while that of cell wool rose from 8 to 12 million kilos.

Hungary

THE BUDAPEST MUNICIPAL BUS SERVICE is testing out the possibilities of coal gas as a substitute for petroleum products. In certain other districts cheap supplies of natural gas are available for country bus services.

Spain

A NITROGEN PRODUCTS FACTORY utilising water power from the El Carrion Falls is projected by the Union Espanola de Esplosivos. For this purpose and also for extensions to the fertiliser, acid and potassium salts plants the capital is to be increased from 60 to 80 million pesos.

Germany

THE I. G. FARBENINDUSTRIE and the I. G. Matthias Stinnes-Mülheimer Bergswerk are associated in the formation of a new company to exploit the patents of the respective concerns relating to production of fuel oil and diesel oil from bituminous and brown coal.

REPORTING ON DEVELOPMENTS in the wood saccharification industry the "Chemische Industrie" (March 28) states that the Dessau Sugar and Chemical Industry Works is building a factory in Dessau to turn out wood spirit (ethyl alcohol) by the Scholler process at the rate of 50,000 hectolitres per annum, the whole of which will be taken over by the Administrators of the State Alcohol Monopoly. Plans are also in hand for a second factory at Holzminden with an annual capacity of 35,000 hectolitres. Finally, the plant of the Deutsche Bergin A.-G., at Mannheim-Rheinau, which is approaching the production stage will be capable of a commencing annual output of 20,000 hectolitres of alcohol.

Weekly Prices of British Chemical Products

THERE are no price changes to report in the markets for general heavy chemicals, rubber chemicals, wood distillation products, pharmaceutical and photographic chemicals, perfumery chemicals, essential oils and intermediates. In the coal tar products section the price of naphthalene (purified crystals) has been advanced from £25 to £26 per ton. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

LONDON.—The demand for chemical products in London during the current week has been rather patchy and prices remain unchanged with a few exceptions.

MANCHESTER.—Relatively quiet conditions have been reported during the past week on the Manchester market for chemical products so far as fresh bookings are concerned, only a moderate volume of business for spot and early delivery, with a sprinkling of new contracts having been transacted, and the spell may be expected to extend until after Easter. As, however, the majority of consumers in Lancashire are already well booked and are taking fair quantities the general position is not unsatisfactory. Values of most descriptions of chemicals, particularly of the heavy products, remain steady. Among the tar distillation products, also, prices have been fairly well maintained, although in the case of pitch comparatively low offers are reported from buyers. On the other hand, firm conditions are ruling in the naphthalene and cresylic acid sections and very little material is obtainable for anything like early delivery, makers being well sold.

SCOTLAND.—There has been an improved demand for chemicals for home trade during the week, though export inquiries still remain very limited. Prices generally continue steady at about previous figures with only slight changes to report.

General Chemicals

ACETONE.—LONDON: £62 to £65 per ton; SCOTLAND: £64 to £65 ex wharf, according to quantity.

ACID, ACETIC.—40% technical, £16 12s. 6d. per ton. LONDON: Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £32 5s. to £34 5s.; tech., 40%, £16 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. SCOTLAND: Glacial 98/100%, £48 to £52; pure 80%, £32 5s.; tech., 80%, £30 5s., d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £48 to £50.

ACID, BORIC.—Commercial granulated, £27 per ton; crystal, £28; powdered, £29; extra finely powdered, £31; packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. B.P. cryst., £36; B.P. powder, £37. SCOTLAND: Crystals, £28; powdered, £29.

ACID, CHROMIC.—10½d. per lb., less 2½%, d/d U.K.

ACID, CITRIC.—11¾d. per lb. MANCHESTER: 11¾d. to 1s. SCOTLAND: 11¾d.

ACID, CRESYLIC.—97/100%, 1s. 5d. to 1s. 6d. per gal.; 99/100%, refined, 1s. 9d. to 1s. 10d. per gal. LONDON: 98/100%, 1s. 5d. f.o.r.; dark, 1s.

ACID, FORMIC.—LONDON: £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 4s. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50; pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works. SCOTLAND: 80°, £24 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 17s. 6d. to £57 10s. per ton, according to packages and position. SCOTLAND: 98/100%, £48 to £50 ex store. MANCHESTER: £48 10s. to £54 ex store.

ACID, SULPHURIC.—SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. LONDON: 11½d., less 5%. SCOTLAND: 1s. 0½d. less 5%. MANCHESTER: 1s. per lb.

ALUM.—SCOTLAND: Lump potash, £8 10s. per ton ex store.

ALUMINA SULPHATE.—LONDON: £7 10s. to £8 per ton. SCOTLAND: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £30 per ton; powdered, £33, in 5-cwt. casks d/d buyers' premises U.K.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £18 to £19. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM SULPHATE.—Neutral quality, 20.6% nitrogen, £7 per ton.

ANTIMONY OXIDE.—SCOTLAND: £61 to £65 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb.; crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.

ARSENIC.—LONDON: £15 per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £23 ex wharf. MANCHESTER: White powdered Cornish, £22, ex store.

ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.

BARIUM CHLORIDE.—LONDON: £10 10s. per ton. SCOTLAND: £10 10s. to £10 15s.

BARYTES.—£6 10s. to £8 per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%, £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £9 5s.

BORAX, COMMERCIAL.—Granulated, £14 10s. per ton; crystal, £15 10s.; powdered, £16; finely powdered, £17; packed in 1-cwt. bags, carriage paid home to buyer's premises within the United Kingdom in 1-ton lots.

CADMIUM SULPHIDE.—5s. 3d. to 5s. 6d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums.

CARBON BISULPHIDE.—£31 to £33 per ton, drums extra.

CARBON BLACK.—3¾d. to 4¼d. per lb. LONDON: 4¼d. to 5d.

CARBON TETRACHLORIDE.—SCOTLAND: £41 to £43 per ton, drums extra.

CHROMIUM OXIDE.—10¾d. per lb., according to quantity d/d U.K.; green, 1s. 2d. per lb.

CHROMETAN.—Crystals, 2⅝d. per lb.; liquor, £19 10s. per ton d/d

COPPERAS (GREEN).—SCOTLAND: £3 15s. per ton, f.o.r. or ex works.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. LONDON: £3 17s. per cwt. SCOTLAND: £3 16s. 6d. net.

DINITROTOLUENE.—66/68° C., 9d. per lb.

DIPHENYLGUANIDINE.—2s. 2d. per lb.

FORMALDEHYDE.—LONDON: £24 10s. per ton. SCOTLAND: 40%, £25 to £28 ex store.

IODINE.—Resublimed B.P., 6s. 3d. to 8s. 4d. per lb.

LAMPBLACK.—£45 to £48 per ton.

LEAD ACETATE.—LONDON: White, £36 10s. per ton; brown, £1 per ton less. SCOTLAND: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36; brown, £35.

LEAD NITRATE.—£32 10s. to £34 10s. per ton.

LEAD, RED.—SCOTLAND: £26 to £28 per ton less 2½%; d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £39 per ton, carriage paid. LONDON: £41.

LITHOPONE.—30%, £16 5s. to £16 10s. per ton.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PHENOL.—6¾d. to 7¼d. per lb. to June 30, 1936.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £38 10s.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. less 5%, d/d U.K. Ground, 5¼d. LONDON: 5d. per lb. less 5%, with discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports. MANCHESTER: 5d.

POTASSIUM CHLORATE.—LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100%, powder, £37. MANCHESTER: £38.

POTASSIUM CHROMATE.—6¼d. per lb. d/d U.K.

POTASSIUM IODIDE.—B.P., 5s. 2d. per lb.

POTASSIUM NITRATE.—SCOTLAND: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8¼d. per lb. SCOTLAND: B.P. crystals, 10d. to 10½d. MANCHESTER: B.P., 11½d.

POTASSIUM PRUSSIATE.—LONDON: Yellow, 8¼d. to 8¾d. per lb. SCOTLAND: Yellow spot, 8¼d. ex store. MANCHESTER: Yellow, 8¼d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. SCOTLAND: Large crystals, in casks, £36.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £13 17s. 6d. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £13 5s. to £14 contracts.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—LONDON: £21 per ton. SCOTLAND: £20 15s.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 15s. ex quay or station. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. Anhydrous, 5d. per lb. LONDON: 4d. per lb. less 5% for spot lots and 4d. per lb. with discounts for contract quantities. MANCHESTER: 4d. per lb. basis. SCOTLAND: 4d. delivered buyer's premises with concession for contracts.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags. Soda crystals, SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality, 7s. 6d. per ton extra. Light Soda Ash, £7 ex quay, min. 4-ton lots with reductions for contracts.

SODIUM CHLORATE.—£30 per ton. SCOTLAND: 3⅝d. per lb.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture, £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals, £14 10s. ex station, 4-ton lots. MANCHESTER: Commercial, £10 5s.; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.

SODIUM IODIDE.—B.P., 6s. per lb.

SODIUM NITRITE.—LONDON: Spot, £18 5s. to £20 5s. per ton d/d station in drums.

SODIUM PERBORATE.—10%, 9½d. per lb. d/d in 1-cwt. drums. LONDON: 10d. per lb.

SODIUM PHOSPHATE.—£13 per ton.

SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 5½d.

SODIUM SILICATE.—140° Tw. Spot, £8 per ton. SCOTLAND: £8 10s.

SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d SCOTLAND: English material, £3 15s.

SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d. to £3 5s.

SODIUM SULPHIDE.—Solid 60/62% Spot, £10 15s. per ton d/d in drums; crystals 30/32%, £8 per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 7s. 6d., d/d buyer's works on contract, min. 4-ton lots. Spot solid, 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £8 2s. 6d.

SODIUM SULPHITE.—Pea crystals, spot, £13 10s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.

SULPHUR.—£9 5s. to £9 15s. per ton. SCOTLAND: £8 to £9.

SULPHATE OF COPPER.—MANCHESTER: £15 per ton f.o.b.

SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.

SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.

VERMILION.—Pale or deep, 5s. 1d. per lb. in 1-cwt. lots.

ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—LONDON: £12 per ton. SCOTLAND: £10 10s.

ZINC SULPHIDE.—10d. to 11d. per lb.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—£7 5s. per ton for neutral quality basis 20.6% nitrogen delivered in 6-ton lots to farmer's nearest station.

CALCIUM CYANAMIDE.—£7 5s. per ton, delivered in 4-ton lots.

NITRO-CHALK.—£7 5s. per ton delivered in 6-ton lots to farmer's nearest station.

NITRATE OF SODA.—£7 12s. 6d. per ton delivered in 6-ton lots to farmer's nearest station.

CONCENTRATED COMPLETE FERTILISERS.—£10 10s. to £10 19s. per ton according to analysis, delivered in 6-ton lots to farmer's nearest station.

AMMONIUM PHOSPHATE (N.P.) FERTILISERS.—£10 5s. to £13 15s. per ton according to analysis, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—99/100%, 2s. 1d. to 3s. per gal., according to specification; pale 98%, 1s. 10d. to 2s.; dark, 1s. 6d. to 1s. 7d. LONDON: 98/100%, 1s. 4d.; dark, 95/97%, 1s. SCOTLAND: Pale, 99/100%, 1s. 3d. to 1s. 4d.; dark, 97/99%, 1s. to 1s 1d.; high boiling acid, 2s. 6d. to 3s.

ACID, CARBOLIC.—Crystals, 6¾d. to 7½d. per lb.; crude, 60's, 2s. 3d. to 2s. 6d. per gal. MANCHESTER: Crystals, 7d. per lb.; crude, 2s. 1d. per gal. SCOTLAND: 60's, 2s. 6d. to 2s. 7d.

BENZOL.—At works, crude, 8½d. to 9d. per gal.; standard motor 1s. 2d. to 1s. 2½d.; 90%, 1s. 3d. to 1s. 3½d.; pure, 1s. 7d. to 1s. 7½d. LONDON: Motor, 1s 3½d. SCOTLAND: Motor, 1s. 6½d.

CREOSOTE.—B.S.I. Specification standard, 5½d. per gal. f.o.r. Home, 3¾d. d/d. LONDON: 4½d. f.o.r. North; 5d. London. MANCHESTER: 5d. SCOTLAND: Specification oils, 4d.; washed oil, 4½d. to 4¾d.; light, 4½d.; heavy, 4½d. to 4¾d.

NAPHTHA.—Solvent, 90/100%, 1s. 5½d. to 1s. 6½d. per gal.; 95/160%, 1s. 9d.; 90%, 1s. to 1s. 2d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160%, 1s. 3d. to 1s. 3½d.; 90/190%, 11d. to 1s. 2d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £17 10s. per ton; purified crystals, £26 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 70s. to 75s.

PYRIDINE.—90/140%, 5s. 3d. to 7s. 6d. per gal.; 90/180, 2s. 3d.

TOLUOL.—90%, 2s. 3d. per gal.; pure, 2s. 7d.

XYLOL.—Commercial, 2s. 2d. per gal.; pure, 2s. 4d.

PITCH.—Medium, soft, 42s. 6d. to 43s. per ton, in bulk at makers' works. MANCHESTER: 37s. 6d. f.o.b., East Coast.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 15s. to £8 10s. per ton; grey, £10 10s. to £11. Liquor, brown, 30° Tw., 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11.

CHARCOAL.—£5 to £10 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £46 to £50 per ton.

WOOD CREOSOTE.—Unrefined, 6d. to 1s. 3d. per gal.

WOOD NAPHTHA, MISCIBLE.—2s. 6d. to 3s. 3d. per gal.; solvent, 3s. to 4s. per gal.

WOOD TAR.—£2 to £2 10s. per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex Toluol).—1s. 9½d. per lb.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works.

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.

BENZIDINE BASE.—Spot, 2s. 5d. per lb., 100% d/d buyer's works.

BENZIDINE HCL.—2s. 5d. per lb.

o-CRESOL 30/31° C.—6d. per lb. in 1-ton lots.

p-CRESOL 34-5° C.—1s. 6d. per lb. in ton lots.

m-CRESOL 98/100%.—1s. 7d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—8d. per lb.

DINITROTOLUENE.—48/50° C., 9d. per lb.; 66/68° C., 10½d.

DINITROCHLORBENZENE, SOLID.—£72 per ton.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.

β-NAPHTHOL.—Spot, £78 15s. per ton, in paper bags.

α-NAPHTHYLAMINE.—Spot, 11½d. per ton., d/d buyer's works.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. per lb., d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb.; 5-cwt. lots, drums extra.

NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.

o-TOLUIDINE.—9½d. to 11d. per lb.

p-TOLUIDINE.—1s. 11d. per lb.

Essential Oils

ANISE.—2s. 6d. per lb.

BERGAMOT.—10s. 6d. per lb.

BOURBON GERANIUM.—24s. per lb.

CASSIA.—80/85%, 4s. 9d. per lb.

CITRONELLA OIL, Ceylon.—1s. per lb.

CLOVE, 90/92% English.—4s. 9d. per lb.

LAVENDER, Mont Blanc.—38/40%, 23s. 6d. per lb.

OTTO OF ROSE, Anatolian.—37s. 6d. per oz.; Bulgarian: 48s. 6d.

PALMA ROSA.—6s. 9d. per lb.

PEPPERMINT, Japanese.—6s. 6d. per lb.; Wayne County: 9s. 6d.

Latest Oil Prices

LONDON, April 1.—LINSEED OIL was easy. Spot, £28 15s. per ton (small quantities); April, £26 2s. 6d.; May-Aug., £26 5s.; Sept.-Dec., £26 7s. 6d., naked. SOYA BEAN OIL was steady Oriental (bulk), April shipment, £21 15s. per ton. RAPE OIL was quiet. Crude, extracted, £34 10s. per ton; technical refined, £36, naked, ex wharf. COTTON OIL was firm. Egyptian crude, £25 per ton; refined common edible, £28 5s.; deodorised, £30 5s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was again lower. American, spot, 44s. 9d. per cwt.

HULL.—LINSEED OIL, spot, quoted £26 10s. per ton; April, £26 2s. 6d.; May-Aug., £26 5s.; Sept.-Dec., £26 7s. 6d. COTTON OIL, Egyptian, crude, spot, £25 10s.; edible, refined, spot £27 15s.; technical, spot, £27 15s.; deodorised, £29 15s., naked. PALM KERNEL OIL, crude, f.m.q., spot, £23, naked. GROUNDNUT OIL, extracted, spot, £30 10s.; deodorised, £33 10c. RAPE OIL, extracted, spot, £33 10s.; refined, £35. SOYA OIL, extracted, spot, £26 10s.; deodorised, £29 10s. per ton. COD OIL, f.o.r, or f.a.s., 25s. per cwt. in barrels. CASTOR OIL, pharmaceutical, 42s. 6d. per cwt.; firsts, 37s. 6d.; seconds, 35s. 6d. TURPENTINE, American, spot, 46s. per cwt.

Chemical and Allied Stocks and Shares

DESPITE the commencement of a new Stock Exchange account on Monday there has been very little expansion of business reported in industrial shares. A very firm undertone has been maintained and with any development of better conditions in the international position there would probably be a good response in share values. Publication of a further batch of reports of prominent industrial companies showing increased profits and in some cases larger dividends created a very good impression. In particular the recently-announced increase in the profits of Imperial Chemical Industries to a new high "record" had a steadying influence on general market conditions. The company's ordinary units have remained firm, although the disposition at the time of writing is to await the full report for any comments on the outlook for the current year. William Blythe 3s. ordinary shares have made the rather lower price of 7s. as a result of a certain amount of disappointment that the hopes of a larger dividend, which had been current in the market, are not realised. The full report will doubtless show that the directors are again dealing conservatively with profits. Salt Union have maintained their firmer tendency on a wider recognition of the scope for increased profits and dividends as time proceeds. Staveley Coal and Iron continued to receive more attention on hopes that the forthcoming results may show a larger dividend than the 8 per cent., tax free, paid for the previous year. Estimates in the market range up to 10 per cent. net. Boots Pure Drug were again active on the possibility of some form of bonus this year. It is being pointed out that the various subsidiary companies distribute their profits conservatively and have reserves of their own, so that the position is probably even stronger than indicated by the balance sheet of the parent company. Fison, Packard and Prentice kept the higher price of 45s. made recently, largely owing to hopes of an increase in the interim dividend. British Cyanides held up well, and there was again a good deal of attention given to British Glues and Chemicals on dividend prospects. British Drug Houses were not quotably affected to any extent by the results which show higher profits and the maintenance of the dividend at 5 per cent. The market had been hopeful of a larger payment, and a favourable increase could have been made if it had not again been decided to place a good proportion of the profits back into the business. No doubt the fact that the company does a considerable export business is a factor which explains the conservative distribution of profits in recent years. United Premier Oil and Cake were very firm on the full results as were General Refractories. Net profits of the latter company were shown by the recently-issued report to have increased from £32,042 to £50,898 and the dividend on the larger capital ranking is raised from 12½ to 15 per cent., while shareholders are having the offer of additional shares on terms involving a bonus. Unilever have held their recent improvement quite well, although it is realised that the question of a larger dividend may well turn on the view taken by the directors as to the outlook for Dutch and French currencies and other factors affecting the widespread business of the group. Lever Brothers preference have again been very steady, awaiting the results. Pinchin Johnson attracted increased attention, the statement at the recent meeting that the company has reserves in excess of its requirements having led to the view that some form of bonus is likely in the future. Lewis Berger continued under the influence of the possibility of a larger dividend. Triplex Safety Glass held up quite well. This is another case where the market is budgeting for a future bonus. There is also continued talk of a bonus or larger dividend from Distillers, although it is realised that this may depend on whether the Budget grants a reduction in the spirit duty. Associated Portland Cement have been active, partly on the favourable impression created by the statements at the meeting. The company's production costs will benefit from the acquisition of land containing favourable supplies of raw material. Goodlass Wall and Lead Industries have been in request on continued hopes in the market of a larger dividend of 7½ per cent. Anglo-Iranian and other leading oil shares reacted earlier in the week, but showed some recovery later.

Name.	March 31.	March 24.
Anglo-Iranian Oil Co., Ltd. Ord.	91/3	91/10½
,, 8% Cum. Pref.	37/6	37/3
,, 9% Cum. Pref.	38/3	38/-
Associated Dyers and Cleaners, Ltd. Ord.	**1/10½**	**1/10½**
,, 6½% Cum. Pref.	6/6¾	6/6¾
Associated Portland Cement Manufacturers, Ltd. Ord.	86/3	86/10½
,, 5½% Cum. Pref.	27/-	27/-
Benzol & By-Products, Ltd. 6% Cum. Part Pref.	6/3	4/4½
Berger (Lewis) & Sons, Ltd. Ord.	69/4½	68/9
Bleachers' Association, Ltd. Ord.	5/7½	6/3
,, 5½% Cum. Pref.	10/7½	11/3
Boake, A., Roberts & Co., Ltd. 5% Pref. (Cum.)	**20/-**	**20/-**
Boots Pure Drug Co., Ltd. Ord. (5/-)	55/6	55/6
Borax Consolidated, Ltd. Pfd. Ord. (£)	112/6	112/6
,, Defd. Ord.	28/1½	28/1½
,, 5½% Cum. Pref. (£10)	£12	£12/5/-
,, **4½% Deb. (1st Mort.) Red. (£100)**	**£107/10/-**	**£107/10/-**
,, **4½% 2nd Mort. Deb. Red. (£100)**	**£105/10/-**	**£105/10/-**
Bradford Dyers' Association, Ltd. Ord.	8/9	8/9
,, 5% Cum. Pref.	12/6	12/6
,, **4% 1st Mort. Perp. Deb. (£100)**	**£86/10/-**	**£86/10/-**
British Celanese, Ltd. 7% 1st Cum. Pfd.	25/-	25/-
,, 7½% Part. 2nd Cum. Pref.	20/6	20/9
British Cotton & Wool Dyers' Association Ltd. Ord. (5/-)	6/-	6/-
,, 4% 1st Mort. Deb. Red. (£100)	£97	£97
British Cyanides Co., Ltd. Ord. (2/-)	4/-	4/3
British Drug Houses, Ltd. Ord.	**21/3**	**21/3**
,, **5% Cum. Pref.**	**21/10½**	**21/10½**
British Glues and Chemicals, Ltd. Ord. (4/-)	8/9	8/-
,, 8% Pref. (Cum. and Part.)	29/4½	29/4½
British Oil and Cake Mills, Ltd. Cum. Pfd. Ord.	48/9	48/9
,, 5½% Cum. Pref.	27/6	26/3
,, **4½% First Mort. Deb. Red. (£100)**	**£107/10/-**	**£107/10/-**
British Oxygen Co., Ltd. Ord.	92/6	93/9
,, **6½% Cum. Pref.**	**32/6**	**32/6**
British Portland Cement Manufacturers, Ltd. Ord.	90/-	88/9
,, 6% Cum. Pref.	29/4½	29/4½
Bryant & May, Ltd. Pref.	**67/6**	**67/6**
Burt, Boulton & Haywood, Ltd. Ord.	21/3	21/3
,, 7% Cum. Pref.	28/9	28/9
,, **6% 1st Mort. Deb. Red. (£100)**	**£102/10/-**	**£102/10/-**

Name.	March 31.	March 24.
Bush, W. J., & Co., Ltd. 5% Cum. Pref. (£5)	108/9	112/6
,, 4% 1st Mort. Deb. Red. (£100)	£94/10/-	£96/10/-
Calico Printers' Association, Ltd. Ord.	8/1½	8/1½
,, 5% Pref. (Cum.)	12/6	12/6
Cellulose Acetate Silk Co., Ltd. Ord.	12/2¼	12/2¼
,, Deferred (1/-)	2/1½	2/1½
Consett Iron Co., Ltd. Ord.	11/9	12/3
,, 8% Pref.	37/6	37/6
,, **6% First Deb. stock, Red. (£100)**	£115/10/-	£115/10/-
Cooper, McDougal & Robertson, Ltd. Ord.	35/-	35/-
,, 7% Cum. Pref.	28/9	28/9
Courtaulds, Ltd. Ord.	50/-	50/10½
,, 5% Cum.	25/7½	25/-
Crosfield, Joseph, & Sons, Ltd. 5% Cum. Pre-Pref.	25/-	25/-
,, Cum. 6% Pref.	28/1½	28/1½
,, 6½% Cum. Pref.	30/-	31/3
,, 7½% "A" Cum. Pref.	31/10½	32/6
Distillers Co., Ltd. Ord.	99/9	100/-
,, 6% Pref. Stock Cum.	30/-	30/-
Dorman Long & Co., Ltd. Ord.	28/9	28/9
,, Pref. Ord.	40/-	41/3
,, 6½% Non-Cum. 1st Pref.	25/-	25/3
,, 8% Non-Cum. 2nd Pref.	25/-	25/9
,, **4% First Mort. Perp. Deb. (£100)**	**£103/10/-**	**£103/10/-**
,, 5% 1st Mort. Red. Deb. (£100)	£106/10/-	£105/10/-
English Velvet & Cord Dyers' Association Ltd. Ord.	3/9	3/9
,, 5% Cum. Pref.	6/3	7/6
,, **4% First Mort. Deb. Red. (£100)**	£67/10/-	£68
Fison, Packard & Prentice, Ltd. Ord.	45/-	45/-
,, 7% Non-Cum. Pref.	31/10½	31/10½
,, **4½% Debs. (Reg.) Red. (£100)**	**£106**	**£106**
Gas Light and Coke Co.	27/9	27/9
,, 3½% Maximum Stock (£100)	£90/10/-	£90/10/-
,, **4% Consolidated Pref. Stock (£100)**	£107/10/-	£108/10/-
,, **3% Consolidated Deb. Stock,** Irred. (£100)	£89/10/-	£90/10/-
,, **5% Deb. Stock Red. (£100)**	£118/10/-	£118/10/-
,, **4½% Red. Deb. Stock (1960-65) (£100)**	£115/10/-	£115/10/-
Goodlass Wall & Lead Industries, Ltd. Ord. (10/-)	**15/7½**	**15/7½**
,, 7% Prefd. Ord. (10/-)	13/1½	13/1½
,, 7% Cum. Pref.	28/9	28/9

Name.	March 31.	March 24.
Gossage, William, & Sons, Ltd. 5% 1st Cum. Pref.	**24/4½**	**24/4½**
,, 6½% Cum. Pref.	28/9	28/9
Imperial Chemical Industries, Ltd. Ord.	38/6	39/9
,, Deferred (10/-)	9/4½	9/7½
,, 7% Cum. Pref.	33/3	33/9
Imperial Smelting Corporation, Ltd. Ord.	17/9	17/9
,, **6½% Pref. (Cum.)**	**25/7½**	**25/7½**
International Nickel Co. of Canada, Ltd. Cum.	$49¼	$50
Johnson, Matthey & Co., Ltd. 5% Cum. Pref. (£5)	**105/-**	**105/-**
,, **4% Mort. Deb. Red. (£100)**	**£98/10/-**	**£98/10/-**
Laporte, B., Ltd. Ord.	120/-	120/-
Lawes Chemical Co., Ltd. Ord. (10/-)	8/9	8/9
,, **7% Non-Cum. Part Pref. (10/-)**	**10/-**	**10/-**
Lever Bros., Ltd. 7% Cum. Pref.	31/6	31/6
,, 8% Cum. "A" Pref.	32/6	32/6
,, 20% Cum. Prefd. Ord.	79/4½	79/4½
,, 5% Cons. Deb. (£100)	£106/10/-	£106/10/-
,, 4% Cons. Deb. (£100)	£104/10/-	£104/10/-
Magadi Soda Co., Ltd. 12½% Pref. Ord. (5/-)	**1/3**	**1/3**
,, 6% 2nd Pref. (5/-)	6d.	6d.
,, 6% 1st Debs. (Reg.)	£40	£40
Major & Co., Ltd. Ord. (5/-)	7½d.	7½d.
,, 8% Part. Prefd. Ord. (10/-)	9d.	9d.
,, **7½% Cum. Pref.**	**1/6¾**	**1/6¾**

Name.	March 31.	March 24.
Pinchin, Johnson & Co., Ltd. Ord. (10/-)	46/-	46/-
,, **1st Pref. 6½% Cum.**	**32/-**	**32/-**
Potash Syndicate of Germany (Deutsches Kalisyndikat G.m.b.H.) 7% Gld. Ln. Sr. "A" and "B" Rd.	£72/10/-	£73/10/-
Reckitt & Sons, Ltd. Ord.	113/9	112/6
,, **4½% Cum. 1st Pref.**	**24/4½**	**24/4½**
Salt Union, Ltd. Ord.	45/-	43/9
,, Pref.	48/1½	48/1½
,, **4½% Deb. (£100)**	**£107/10/-**	**£107/10/-**
South Metropolitan Gas Co. Ord. (£100)	£122/10/-	£121/10/-
,, **6% Irred. Pref. (£100)**	**£149/10/-**	**£149/10/-**
,, 4% Pref. (Irred.) (£100)	£105/10/-	£105/10/-
,, **Perpetual 3% Deb. (£100)**	**£89/10/-**	**£89/10/-**
,, **5% Red. Deb. 1950-60 (£100)**	**£115/10/-**	**£115/10/-**
Staveley Coal and Iron Co., Ltd. Ord.	53/1½	51/3
Stevenson & Howell, Ltd. 6½% Cum. Pref.	**26/3**	**26/3**
Triplex Safety Glass Co., Ltd. Ord. (10/-)	87/6	88/9
Unilever, Ltd. Ord.	32/6	32/6
,, 7% Cum. Pref.	29/9	30/3
United Glass Bottle Manufacturers, Ltd. Ord.	44/4½	44/4½
,, **7½% Cum. Pref.**	**32/6**	**32/6**
United Molasses Co., Ltd. Ord. (6/8)	23/9	23/9
,, 6% Cum. Pref.	26/3	26/3
United Premier Oil & Cake Co., Ltd. Ord. (5/-)	12/6	12/6
,, 7% Cum. Pref.	25/-	25/-
,, **4½% Deb. Red. (£100)**	**£104**	**£104**

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Specifications Open to Public Inspection

FINISHING OF METALLIC SURFACES.—American Chemical Paint Co. Sept. 13, 1934. 949/35.

VULCANISATION OF RUBBER.—Wingfoot Corporation. Sept. 14, 1934. 15619/35.

CONTINUALLY CRYSTALLISING SUGAR SOLUTIONS, processes.—J. A. Platte and G. H. de Vries. Sept. 14, 1934. 21249/35.

DYESTUFFS OF THE INDANTHRONE SERIES, manufacture.—E. I. du Pont de Nemours and Co. Sept. 10, 1934. 25194/35.

AZO DYESTUFFS insoluble in water, manufacture.—I. G. Farbenindustrie. Sept. 11, 1934. 25266/35.

WATER-INSOLUBLE AZO DYESTUFFS, manufacture.—I. G. Farbenindustrie. Sept. 12, 1934. 25267/35.

REFINING HYDROCARBON OILS, processes.—Texaco Development Corporation. Sept. 12, 1934. 25278/35.

ORGANIC PEROXIDES, process for manufacture.—Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. Sept. 14, 1934. 25287/35.

UNSATURATED DIKETONES related to the follicle hormone, manufacture.—Schering-Kahlbaum A.-G. Sept. 12, 1934. 25388/35.

3-ALKOXY-4-OXYBENZALDEHYDES, manufacture.—Dr. C. N. Geneff. Sept. 14, 1934. 25469/35.

NEW ACID WOOL DYESTUFFS of the anthraquinone series, process for manufacture.—I. G. Farbenindustrie. Sept. 14, 1934. 25490-1/35.

THERAPEUTICALLY VALUABLE METAL COMPOUNDS of keratinic acids, process.—J. A. Wülfing Chemische Fabrik. Sept. 15, 1934. 25718/35.

FRACTIONAL DISTILLATION of mixtures of substances, process and apparatus.—J. Schmidlin. July 9, 1934. 444,014.

Specifications Accepted with Date of Application

ACID CALCIUM LACTATES and methods of preparing same.—Royal Baking Powder Co. May 23, 1933. 443,705.

WATER-SOLUBLE CONDENSATION PRODUCTS suitable as assistants in the textile and related industries, manufacture and production of valuable.—Coutts and Co. and F. Johnson (legal representatives of J. Y. Johnson (deceased)) (I. G. Farbenindustrie). June 15, 1934. 443,559.

ANTHRAQUINONE DYESTUFFS.—Imperial Chemical Industries, Ltd., N. H. Haddock and C. H. Lumsden. June 28, 1934. 443,776.

CELLULOSE ESTER MATERIALS, manufacture or treatment.—H. Dreyfus. June 30, 1934. 443,710.

AZO DYESTUFFS, process for manufacture.—A. Carpmael (I. G. Farbenindustrie). Aug. 2, 1934. 443,778.

PRESERVATION OF RUBBER.—Imperial Chemical Industries, Ltd., W. Baird and C. R. Mavin. Aug. 3, 1934. 443,779.

CELLULOSE TRIACETATE, treatment.—Distillers Co., Ltd., H. A. Auden, H. P. Staudinger and P. Eaglesfield. July 31, 1934. 443,564.

EMULSIFYING AND LIKE AGENTS.—W. E. Billinghame. Aug. 25, 1934. 443,719.

IMPREGNATING BATHS for producing azo dyestuffs on textile fibres, preparation.—A. Carpmael (I. G. Farbenindustrie). Aug. 28, 1934. 443,638.

AZO DYESTUFFS CONTAINING METAL, manufacture and production. Coutts and Co., and F. Johnson (Legal representatives of J. Y. Johnson (deceased)). (I. G. Farbenindustrie.) Aug. 29, 1934. 443,722.

3:4:5:6-TETRAHALOGEN-2-AMINO-1-OXYBENZENES, manufacture. I. G. Farbenindustrie. Nov. 2, 1933. 443,580.

Applications for Patents

(March 5 to 11 inclusive.)

NITROSO-β-NAPHTHOL PIGMENTS, manufacture.—E. R. Allen. 7087.

MEANS FOR PREVENTING THE ATTACK of solutions containing halides on iron, etc.—E. Berl. 7207.

DYE STAINS, manufacture.—J. F. T. Berliner. 7088.

DYESTUFFS CONTAINING METAL in complex union, manufacture.—A. G. Bloxam (Soc. of Chemical Industry in Basle). 6685.

ALCOHOLIC FERMENTATION.—F. Boinot and Usines de Melle. (France, March 30, '35.) 7049.

TITANIUM PIGMENTS, production.—British Titan Products Co., Ltd. (United States, March 15, '35.) 6730.

NITROSO-β-NAPHTHOL PIGMENTS, manufacture.—A. A. Brizzolara, A. Siegel, and E. I. du Pont de Nemours and Co. 7271.

CHEMICAL REACTIONS FOR REDUCTION of volatile metals, etc., requiring high temperatures, production.—D. F. Campbell and Electric Furnace Co., Ltd. 7210.

MALEIC ACID, production.—Carbide and Carbon Chemicals Corporation. (United States, April 9, '35.) 6914.

AZO DYESTUFFS, manufacture.—A. Carpmael (I. G. Farbenindustrie). 7127.

NEW DYESTUFFS of the anthraquinone series, manufacture.—A. Carpmael (I. G. Farbenindustrie). 7128.

CELLULOSE ESTER FOILS, ETC., manufacture.—Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. (Germany, March 6, '35.) 6859, 6860.

METALS, degreasing.—E. I. du Pont de Nemours and Co. 6719.

METHACRYLIC ACID ESTERS, ETC., polymerisation.—E. I. du Pont de Nemours and Co. (United States, March 8, '35.) 7085.

METALLIC ARTICLES, means for degreasing.—E. I. du Pont de Nemours and Co. (United States, March 7, '35.) 7086.

NITROSO-β-NAPHTHOL PIGMENTS, manufacture.—E. I. du Pont de Nemours and Co. 7087.

DYESTAINS, manufacture.—E. I. du Pont de Nemours and Co. 7088.

From Week to Week

A PETITION has been presented to the Court of Session by the British Dyewood Co., Ltd., 19 St. Vincent Place, Glasgow, for reduction of capital.

HOWARDS AND SONS, LTD., announce that their works, warehouses and offices will be closed from Friday, April 10, to Tuesday, April 14, for the Easter holidays.

TWO EMPLOYEES were injured when fire broke out at the cellars of Wands, Ltd., manufacturing chemists, Wellington Street, Leicester. It is understood that the fire was caused by the overflowing of a quantity of ether. There was a flash and the men's clothing caught fire.

STOCKTON CHEMICAL ENGINEERS AND RILEY BOILERS, LTD., of Perseverance Works, Stockton-on-Tees, are opening their own office in London, at Clun House, Surrey Street, Strand, W.C.2. (Telephone No.: Temple Bar 1043.) This office will be under the immediate charge of their sales director, Mr. E. A. Parr-Dudley.

FROM PREPARATIONS THAT ARE BEING MADE it is expected that in the near future, the South Durham Steel and Iron Co. will re-start their Seaton Carew blast furnaces which have been idle for 10 years owing to trade depression. This will mean work for many men in the Longhill area of West Hartlepool, who have been unemployed ever since the furnaces were closed down.

THE TERM "C.I.F." is in daily use by most exporters, but probably very few appreciate the legal difficlties which can arise in the event of trouble, in view of the complicated nature of the law of c.i.f. contracts. For instance, when one enter into a c.i.f. contract, does one contract for the sale of goods or only for the sale of documents relating to goods? What is one's position as an exporter if, having delivered the documents to the customer, the goods find their way to the bottom of the sea? These and a host of similar questions are dealt with in a treatise by Mr. Ronald Haylor, barrister-at-law, on "The Law of C.I.F. Contracts." It is published by the Institute of Export, 21 Tothill Street, S.W.1, from whom copies can be obtained at 1s. each.

FORTY THOUSAND GALLONS OF TAR, belonging to Howard and Price, tar distillers, of Bar Road, Lincoln, were threatened by fire which broke out at the works on March 28. Two hundred 40-gallon barrels in the centre of a dump were blazing when the brigade arrived and a feed pipe exuding burning tar was adding fuel to the flames, which were preventing the workmen from getting anywhere near the tap to turn off the supply. The distillery adjoins a railway line and the fire brigade had to remove ballast from the lines to connect their hose to a hydrant before they could begin tackling the blaze. Tar had flooded the yard to a depth of eight inches, and this greatly hampered the men. About 2,000 gallons of tar were burnt but the buildings and machinery were not extensively damaged.

PROFESSOR DONALD C. STOCKBARGER of the Massachusetts Institute of Technology announced before the recent meeting of the American Physical Society in Baltimore the preparation of optically perfect lithium fluoride crystals, over three inches in diameter. This discovery is considered to constitute a very important development in the field of optics. Lithium fluoride crystals possess the ability to transmit light waves from high in the infrared region, through the visible band and extending into the invisible ultra-violet region. This range of transmissibility is not possessed by any other known substance. The lithium fluoride is first powdered, then melted in a platinum crucible in a specially designed electric furnace provided with a device for temperature control. After the fluoride has melted, the melt is seeded with a tiny crystal of lithium fluoride and the cooling is allowed to take place slowly. Lithium fluoride crystallises in cubic formation and can be cut and polished easily.

THERE WAS A PRIVATE MEETING of the China Clay Producers of Cornwall and Devon at St. Austell on Monday when the question of the possibility of a revision in the rates of pay to be made to the workers in the industry, was considered. After a lengthy discussion, it was agreed to recommend to all producers to post notices in each of their works to the effect that the company have had under consideration for some time past the rates of pay of the employees. It has now been decided that from Saturday, April 4, next, the rate of wages for day workmen will be 11½d. per hour, with a proportionate increase to all men paid at other rates. It is hoped that the conditions of the industry may still further improve so as to enable the producers to restore the 1d. per hour cut in May, 1932. The meeting was held in accordance with a resolution contained in the annual report of the British China Clay Producers' Federation that this question of the restoration of the cut from 1s. to 11d. should be considered at the earliest opportunity. The pay of the day workmen, which is the lowest rate, applies to about 50 per cent., and to employers of between two and three thousand men will involve an addition to their pay roll of over £11,000.

THE NOMINAL CAPITAL of New Scientific Products, Ltd., has been increased by the addition of £500 in £1 ordinary shares beyond the registered capital of £500.

THE DATE of the annual general meeting of the Liverpool Section of the Institute of Chemistry has been changed, owing to the Easter holidays, from April 9, as given in the official programme, to April 16.

INCREASING DEMAND for Saunders valves has necessitated a large modern plant specially planned for their production. The Saunders Valve Co., Ltd., has therefore removed this week to Drayton Street, Wolverhampton.

THE ANNUAL DINNER AND DANCE of Charles Cox and Sons, Ltd., bleachers and dyers, of Nottingham, was held at the Albert Hotel, Nottingham. During the evening reference was made to the sports club which it was stated had now become a feature of the works.

HUTCHINSON AND CO., LTD., the original publishers of Sir Ernest Benn's book "The Confessions of a Capitalist," announce that on May 14 the book is to be included in their Booklovers' Library. This makes the thirteenth English edition of "The Confessions" in addition to eight separate foreign translations. Although "The Confessions" is now more than ten years old, its popularity as a standard exposition of orthodox economics continues to grow.

THE METROPOLITAN-VICKERS ELECTRICAL CO., LTD., has issued its "Girl" calendar 1936-37. This year the company has selected neither a famous actress nor a film star, but a rather fascinating subject of fair English beauty to take a place in its series of calendars. She prefers to be called "Cynthia" rather than disclose her identity.

SINCE THE SHRINKAGE OF OPERATIONS in the shalefield took place a few years ago, Scottish Oils, Ltd., have pursued the policy of granting pensions to men who had been employed in the shalefield for many years and who were not likely to be employed again owing to their age. The company, it is understood, has now carried the policy a step further and has retired all workmen of 70 years of age and over, although their duties did not entail hard manual labour. It is believed locally that this policy will result in employment for more younger men.

ANXIETY IS FELT AT WEST COUNTRY PORTS, more especially in Cornwall, at the increase in the number of foreign vessels now engaged in the British coasting trade. These ships, most of them motor-coasters, are engaged principally in carrying china clay, coal, stone, granite and other materials for road making, public works and housing schemes. Since the beginning of the year over thirty foreign ships have carried cargoes between Falmouth and Par and other United Kingdom ports, it is stated, and the M.P. for the division, Mr. Maurice Petherick, is to raise the matter in Parliament.

SIR PATRICK HANNON, M.P., president of the National Union of Manufacturers, has sent to the Prime Minister an offer of assistance by the Union (which represents in the main medium and smaller sized manufacturing firms), in connection with the Government's re-armament programme. The Union has assured the Government that it will co-operate in securing that not more than a fair price shall be paid for work done. Mr. Stanley Baldwin, in acknowledging the letter with thanks, write: "One of the most difficult problems before us in connection with the re-armament programme is the question of the control of profits and this difficulty is particularly great in connection with the profits of sub-contractors. It is therefore gratifying to have the assurance which your Union has given and to be able to rely upon the services of the officers of the Union in cases where they may be of assistance."

LARGE-SCALE DRILLING FOR OIL IN ENGLAND began on March 30, when Mrs. Crookshank, mother of Captain H. F. C. Crookshank, M.P. (Secretary for Mines), set in motion plant erected by the Anglo-Iranian Oil Co. at Paulsgrove, on the slope of Portsdown Hill, overlooking Portsmouth. Sir John Cadman, chairman of the company, said they hoped that enterprise would eventually be of great national importance and value. It was based on scientific observation and organised with all the elaboration of detail that engineering skill and experience could suggest. Still, with all the advantages that modern science could provide, they must go forward as adventurers into the unknown, where, in the language of the oilfield, "only the drill can tell." In choosing this particular site the company had not been guided by any romantic conception of the venture, but by a volume of geological evidence. The Paulsgrove site covers about five acres. The boring plant is capable of penetrating 8,000 feet, and experiments are expected to last eighteen months. If rock is encountered the work may last two and a half years. The work is to be carried out under a prospecting licence granted by the Board of Trade to the d'Arcy Exploration Co.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

Canada.—An agent established at Montreal wishes to obtain the representation, on a commission basis, for Montreal and Toronto, of United Kingdom manufacturers of drugs and cosmetics. (Ref. No. 225.)

Lithuania.—An agent established in Kovno wishes to secure the representation, on a commission basis, of United Kingdom manufacturers of chemical dyes for textile industry, and pharmaceutical articles. (Ref. No. 234.)

Spain.—An agent established at Murcia wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of fertilisers, chemical products and machinery. (Ref. No. 236.)

Egypt.—The Commercial Secretary to the Residency, Egypt, reports that the Egyptian Ministry of the interior is calling for tenders to be presented in Cairo by May 18, 1936, for the supply of photographic chemicals, plates, paper and cinematograph films for the year 1936-37. (Ref. T.Y. 50002.)

Egypt.—The Commercial Secretary to the Residency, reports that the Egyptian Ministry of Public Works is calling for tenders, to be presented in Cairo by April 27, 1936, for the supply of paints, etc. (Ref. T.Y. 50003.)

New Companies Registered

Advance Products, Ltd.—Registered March 25. Nominal capital £600 in £1 shares. Manufacturers and merchants of chemical products and chemists' sundries. Subscribers: Ernest J. Morrison, 5 Upton Avenue, Cheadle Hulme, Cheshire, and Cyril A. Luce.

Allied Oil Corporation, Ltd., 22 Basinghall Street, E.C.2.—Registered March 18. Nominal capital £1,000 in 8,000 shares of 2s. 6d., with power to increase. To acquire any lands, concessions, mining rights, metalliferous and petroliferous lands containing or supposed to contain coal, anthracite, shale, bitumen, oil, clay, iron, copper, lead, tin, silver, gold, asbestos, sulphur or other minerals, and to enter into an agreement with the Franco-British Oil Trust, Ltd. (in liquidation), and its liquidator. Subscribers: Harold E. Skan and Percy H. Brashier.

Duratex Processes, Ltd., 37-8 Fenchurch Street, E.C.3.—Registered March 28. Nominal capital £3,000. To carry on any business connected with chemical recipes and chemical processes of manufacture, and that of manufacturers of and dealers in all goods made by any chemical, scientific or other processes, to apply for and register or acquire the trade mark or trade name "Duratex." Subscribers: Frank Worham and Wm. G. Hobnor.

Emoleum, Ltd.—Registered March 27. Nominal capital £1,000 in £1 shares. To acquire from Dussek Bitumen and Taroleum, Ltd., the full and exclusive licence and authority to use the trade name "Emoleum" and to carry on the business of manufacturers and refiners of and dealers in bitumen, tar and bitumen and tar compounds, etc. Subscribers: J. I. Breman, and Maurice A. Nelson, 64 Lincoln's Inn Fields, W.C.2, solicitor.

F. W. Ball, Ltd.—Registered March 28. Nominal capital £1,000 in £1 shares. Manufacturers of and dealers in chemical, pharmaceutical, cosmetic and other preparations, etc. Subscribers: Josef Wachbel, 69 Warrington Crescent, W.9, and Frederick W. Ball.

Omicron Products, Ltd.—Registered March 27. Nominal capital £500 in £1 shares. Manufacturers of and dealers in drugs, mechanical objects, technical and chemical objects, scientific, optical, technical and other instruments, etc. Subscribers: Ernst Schoendorff, 25 Devonshire Terrace, Lancaster Gate, W.2, and Arthur E. Holton.

Woodstains and Products, Ltd.—Registered March 27. Nominal capital £2,000 in £1 shares. Manufacturers of and dealers in chemical, vegetable and other stains, dyes, dyestuffs, chemical colour, paints, pigments, oils, waxes, polishes, gums, varnishes, etc. Directors: H. J. Bachell, 58 Barriedale, S.E.14, and S. A. Beards.

Forthcoming Events

LONDON

Apr. 6.—Society of Chemical Industry (London Section). "Rayon Manufacture, with Particular Reference to Recent Technical Developments." A. B. Shearer. 8 p.m. Burlington House, Piccadilly, London.

Apr. 6.—Institution of the Rubber Industry. "The Critical Temperature of Acceleration," Klaus W. Eliel; "Rapid Tensile Testing with the Eccentric Schopper Ring," E. J. May; "The Vulcanisation of Rubber with m-Dinitobenzene," J. M. Wright. 7.30 p.m. British Empire Club, 12 St. James's Square, London.

BIRMINGHAM

Apr. 7.—Electrodepositors' Technical Society. "Pre-treatment of Metal for Final Finishing." B. C. Taylor. 7.30 p.m. Gt. Charles Street, Birmingham.

NEWCASTLE-ON-TYNE

Apr. 7.—Institute of Metals (North-East Coast Section). Annual general meeting. Demonstration of High Frequency Induction Furnace. 7.30 p.m. Electrical Engineering Lecture Theatre, Armstrong College, Newcastle-on-Tyne.

SHEFFIELD.

Apr. 10.—Society of Chemical Industry (Yorkshire Section). "The Influence of Sulphur in Fuel on the Scaling of Steel." Professor J. W. Cobb and H. C. Millett. Sheffield.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt as specified in the last available Annual Summary, is also given marked with an *—followed by the date of the Summary, but such total may have been reduced.)

AVIS FERTILIZER CO., LTD., London, W. (M., 4/4/36.) Registered March 24, £900 debentures, part of £2,000 and 5 per cent. premium already registered.

CHEMICAL ENGINEERING AND WILTON'S PATENT FURNACE CO., LTD., London, S.W. (M., 4/4/36.) Registered March 19, mortgage, to Westminster Bank, Ltd., securing all moneys due or to become due to the Bank; charged on lease of premises at Hendon, etc. *£4,650. December 31, 1935.

GRAPHITE OILS CO., LTD., Immingham Dock. (M., 4/4/36.) Registered March 20, £1,621 4/0 debenture, to J. A. Montgomerie, 14 Central Avenue, Cambuslang, Glasgow; general charge. *£5,242. April 16, 1935.

RAIMES AND CO., LTD., York, manufacturing chemists, etc. (M., 4/4/36.) Registered March 19, £3,150 mortgage (section 81, 1929 Act) on property acquired February 15, 1935, to Executors of Jas. Melrose, deceased; charged on Micklegate House, Micklegate, and Toft Green, York. *£3,150. January 1, 1936.

Satisfactions

MALEHURST BARYTES CO., LTD., Minsterley. (MS., 4/4/36.) Satisfaction registered March 21, of debenture and further charge registered July 30, 1932, and October 19, 1932, to extent of £2,000.

County Court Judgments

(NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court Judgments against him.)

BERNARDI, ANTHONY, 70 St. Margaret's Road, Edgware, doctor of chemistry. (C.C., 4/4/36.) £15 4s. 10d. February 28.

McPHAIL, ROBT., and McPhail, Janet (his wife), 38 Spencer Road, Wembley, chemical buyer. (C.C., 4/4/36.) £18 4s. 11d. January 31.

CASTLE PARTNERS, LTD., 55 Temple Row, Birmingham, metallurgists. C.C., 4/4/36.) £15 5s. 10d. February 5.

SIR JOHN CADMAN, chairman of the Anglo-Iranian Oil Co., opened an institute for employees at the company's oil refineries at Neath, Glamorgan, on Wednesday. Later he addressed the South Wales branch of the Institution of Petroleum Technologists on the origin and growth of the oil industry in the United Kingdom and Iraq, and on efforts to discover oil in this country.

Company News

Sadler and Co.—The payment is announced of a dividend of 3 per cent., less tax, against 2½ per cent. this time last year.

William Blythe & Co.—The payment is announced of a final dividend of 7 per cent. on the ordinary shares, making 10 per cent. for the year.

Briton Ferry Chemical and Manure Co.—The accounts for 1935 show debit balance of £9,447 (against £9,913) after £1,011 has been placed to depreciation. Adding debit £14,064 brought in, makes an adverse balance of £23,511 to be carried forward.

Bede Metal and Chemical Co.—The profit for 1935, after depreciation, is reported to be £4,104; add £8,427 brought in, making £12,531. The dividend, 3d. per share, less tax, absorbs £2,180; to reserve for replacements is placed £2,000, leaving to go forward, £8,350.

Tharsis Sulphur and Copper Co.—The net profit for 1935 after writing approximately £35,314, against £24,757, for depreciation was £76,420, against £62,617 in 1934. The amount brought in is £114,867, making £191,287. The dividend for the year was 5 per cent., leaving to go forward £128,787.

Alexander Duckham and Co.—The report for 1935 shows gross profit of £154,697, against £152,697 in 1934, and profit on investment sales £860, making £155,557. Expenses and depreciation absorb £125,385 (£124,191), and fees £1,350 (£1,308), leaving net revenue at £28,823 (£27,198). Tax absorbs £3,173 (£2,458). The directors recommend final dividend of 8 per cent., again making 12 per cent., and repeat reserve allocation at £12,000.

British Drug Houses, Ltd.—The report for 1935 shows trading profit £59,766 (against £57,875); deducting amortisation of leaseholds, depreciation of plant, directors' fees and tax, amounting to £15,768 (£15,821), leaves £43,998 (£42,054); add £10,172 brought in, making £54,170. To preference dividend is placed £13,137; ordinary dividend, 5 per cent., less tax (same); to general reserve, £10,000, leaving to be carried forward, £11,032.

Jenson and Nicholson.—The report for 1935 shows trading profit of £63,559 (against £55,859 in 1934), and net balance, after depreciation, interest and fees, £47,798 (£39,035). Tax reserve is £13,111 (£10,714); preference payments, including two years' dividend on "A" preference shares take £34,063, and transfer to preference dividend reserve is £3,298. Directors propose ordinary dividend of 10 per cent. (first since 1928), and transfer of £2,000 to general reserve. The amount carried forward is £3,296.

Lever Bros.—The report states that net earnings amounted to £6,951,187, showing an increase of £648,312 on the 1934 figure of £6,302,875. After including £306,779 brought in, the available balance is £7,257,966. The dividend on the ordinary stock, which is held by Unilever, is maintained at 15 per cent., less tax, for the fourth successive year. In May last, Unilever took up £2,000,000 more of this stock, and the present distribution, which is payable on the increased capital, will, therefore, require £300,000 more at £1,275,000. Allocations to general and contingencies reserves again total £500,000, but, in addition, there is also this year a transfer of £300,000 to "reserve against shares in allied companies." The carry-forward is £394,653.

Books Received

Official Publications

Bulletin of the Imperial Institute. Vol. XXXIV. No. 1. January-March, 1936. London: Imperial Institute. 2s. 6d.

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